

1998

Eating-Disorder Patterns in the Minnesota Multiphasic Personality Inventory

Karen Baer-Barkley
Andrews University

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EATING-DISORDER PATTERNS IN THE MINNESOTA
MULTIPHASIC PERSONALITY INVENTORY

A Dissertation
Presented in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

by
Karen Baer-Barkley

August 1998

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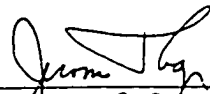
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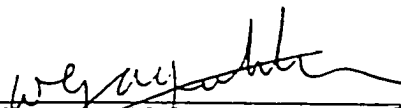
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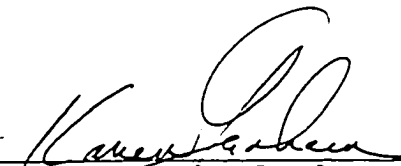
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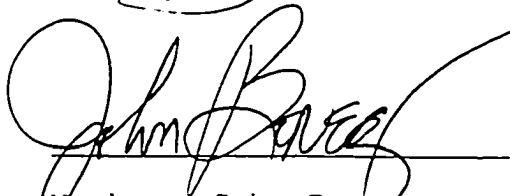
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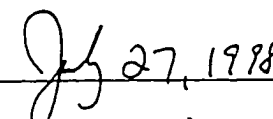

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 27, 1988
Date Approved

ABSTRACT

EATING-DISORDER PATTERNS IN THE MINNESOTA
MULTIPHASIC PERSONALITY INVENTORY

by

Karen Baer-Barkley

Chair: Tim Spruill

ABSTRACT OF GRADUATE STUDENT RESEARCH

Dissertation

Andrews University

School of Education

Title: EATING-DISORDER PATTERNS IN THE MINNESOTA
MULTIPHASIC PERSONALITY INVENTORY

Name of researcher: Karen Baer-Barkley

Name and degree of faculty chair: Tim Spruill, Ph.D.

Date completed: August 1998

Problem

Early intervention is crucial for effective treatment of eating disorders. While there have recently been many assessment tools developed specifically for eating disorders, a screening tool is still needed. This study sought to identify, in an eating-disordered sample, the existence of a v-shaped pattern on scales 4-5-6 of the MMPI, a commonly used general measure of psychopathology.

Method

The sample consisted of 356 females who were being treated for eating disorders through the HOPE program between 1989 and 1996. Past research on the MMPI has

produced equivocal results on identifying significant patterns on the clinical scales. Since prior research did not control for the effects of comorbidity, this study considered additional diagnoses in the analysis of the data.

Results

The results of this research supported the existence of an eating-disorder pattern for anorectic and bulimic subjects that departed significantly from that of a normal population. The v-shaped pattern was tested at four different levels of magnitude. Statistical analysis confirmed that the v-shaped pattern, defined in several different ways, occurred significantly more than would be expected by chance. Additionally, the presence of comorbidity appeared to have little effect on the proportion of individuals showing the V-shaped profile.

Conclusions

This research supports the existence of a 4-5-6 pattern as a means of identifying individuals appropriate for more focused assessment.

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ACKNOWLEDGMENTS

I would like to acknowledge the support and advice of my committee members, Tim Spruill, Wilfred Futch, and John Berecz. Thank you Dr. Spruill for your support, guidance, insights, and kindness throughout this process. Dr. Futch, I appreciated your invaluable advice and assistance in the statistical analysis. I also appreciated your patience, time, and kindness in working with me throughout the dissertation process. Dr. Berecz, I appreciated the time and insights you put into my dissertation.

Most importantly, I would like to thank my family, who has been a constant source of strength through my life. To Gregg, my husband and soul mate, thank you for making a dream come true. It would have been difficult if not impossible to complete this degree without your love and support throughout the process. You were always there for me in terms of listening to my frustrations, taking over with the kids, or simply giving me a hug. I will always appreciate the many sacrifices you made along the way so that I could reach my desired goal. To my sons, Conor and Griffin, thanks for constantly reminding me of the truly important things in life.

I have also been blessed with wonderful parents.

Thank you Mom and Dad for my "roots and wings" and all you did along the way to help me complete my goal. Your support and kindness truly made a difference. I appreciate the many times you watched the boys so that I could make it to class or complete a paper. Knowing they were in loving hands enabled me to focus and complete my requirements.

I also need to acknowledge my sister, Julie, for her support and kindness. I appreciate your assistance in preparing for the defense as well as your presence throughout the process. You have always been there for me and I feel very blessed to have such a good friend for my sister. I also want to thank my older brothers, Rick and Wayne, for their kind words and support throughout this process.

Friends, in addition to family, have also made the completion of this goal possible. I want to acknowledge old and new friends alike. Thank you to Anne Martin, Sue England, Carolyn Weber, Kris Pendley, Peggy Frick, Rose Kopec, and John Batka for your support, encouragement, empathy and willingness to listen.

Completing my Ph.D. has been a long journey from September of 1987, when I started my first Master's class, to August of 1998, when I finished the final requirement for the completion of my Ph.D. Through my travels I have had the honor to meet many wonderful individuals. To all of these people, and to God, I would like to say thank you for making the journey insightful.

CHAPTER I

INTRODUCTION

As the prevalence of eating disorders increases, so does their importance to psychotherapists. It is estimated that more than 5 million Americans suffer from eating disorders (Pamphlet, The American Anorexia/Bulimia Association, 1995). Study of these disorders has yielded diagnostic criteria and treatment modalities. Despite these criteria, accurate assessment at early stages remains a challenge, particularly in the cases of individuals whose physical appearance may remain unchanged.

Early diagnosis and treatment of eating disorders is desirable to prevent entrenchment of these diseases. Many times the disease is severely entrenched by the time victims seek treatment. This occurs for several reasons. The denial inherent in eating disorders prevents individuals from recognizing their problem. However, for anorectic individuals, concerned others may attend to the significant weight loss observed in the individuals. Bulimic individuals, however, may go undetected for a much longer time because their overall physical appearance may remain the same. Additionally, the pathology of

depression, impulsivity, and anxiety makes it difficult for individuals to seek early treatment and prevent entrenchment of the disease. Individuals usually seek treatment when they feel completely out of control of their eating behavior and report experiencing difficulty in relationships and/or job performance.

Identifying an eating-disorder pattern in the Minnesota Multiphasic Personality Inventory (MMPI) may identify those individuals at risk or in the early stages of the eating disorder. Having this knowledge, clinicians could further assess eating patterns and the possible existence of eating disorders. It is hoped that this type of pattern would assist clinicians in identifying individuals suffering from eating disorders. Awareness of the psychopathology affiliated with these diseases may also play a key role in effectively treating eating disorders.

Thus, the issue of identifying individuals suffering from an eating disorder prior to entrenchment of the disease remains the challenge. For anorectic individuals, their physical appearance often betrays their secret whereas, for bulimic individuals, behavior changes in eating habits often call attention to their eating disorder. Following the administration of the MMPI and identification of a particular eating-disorder pattern, uncertain clinicians could administer additional eating-disorder assessments to verify or further clarify an eating-disorder diagnosis.

Given the time constraints imposed by managed care and the high prevalence of eating disorders in our culture, therapists need as much information as possible about these syndromes. It is the goal of this research to identify an eating-disorder pattern in the MMPI which could ultimately assist the therapist to further assess for the presence of an eating disorder. Given the popularity and accessibility of the MMPI as a comprehensive measure of personality and emotional functioning in the mental health field, the identification of an "eating disordered pattern" would be yet another source of information obtained from this particular assessment.

Learning additional information about eating-disorders diagnosis from an assessment tool that is readily available in most clinical settings would be useful especially to those practitioners not specialized in eating disorders. This information may prove to be a helpful clinical tool for all practitioners in both the private and academic setting. Thus, in a clinical practice setting the MMPI may provide significant information in the diagnosis of eating disorders. Anorexia and bulimia nervosa are the identified eating disorders studied in this research.

Background of the Problem

Anorexia Nervosa

The syndrome of anorexia nervosa has been recognized in the medical literature as a psychiatric syndrome for

more than 100 years (Gull, 1874). Extreme weight loss, which sometimes can become life threatening, is the primary clinical feature of anorexia nervosa. This weight loss is due to excessive restrictive eating in addition to excessive exercise and/or self-induced vomiting or laxative abuse. This behavior is driven by a strong preference for thinness and extreme fear of weight gain. Additionally, these individuals experience a perceptual distortion in their actual body size. Despite being thin, many of these individuals view themselves as fat (Williamson, 1990).

Anorexia nervosa has physical, psychological, and behavioral consequences. Physical consequences of severe weight loss and restrictive eating include amenorrhea, loss of hair, lowered body temperature, and dry skin due to dehydration. Behavioral consequences of an eating disorder sometimes include food rituals regarding what can and cannot be consumed. Anorectics' restrictive food habits also result in extreme fatigue, which ultimately decreases their overall physical activity. Anorectics' behavior becomes completely motivated by their fear of fat and intense desire to lose weight (Williamson, 1990).

Psychological consequences result in an obsession with thinness, intense fear/anxiety surrounding weight gain, and perfectionistic thought processes. Anorectic individuals' perfectionism ultimately results in depression and unrealistic expectations, which produce feelings of powerlessness and worthlessness (Garner & Garfinkel, 1985).

Anorectic individuals display submissive and passive behavior. Many times anorectic individuals feel that their mistreatment from others is justified. Anorectic individuals also have a difficult time expressing anger, and may use their eating behavior as a way to suppress and covertly deal with their feelings. These issues of perfectionism, control, self-denial, and submission make treatment difficult (Williamson, 1990).

Bulimia Nervosa

Bulimia nervosa was not identified until the 1960s and 1970s. Prior to this time period, the binge-purge behavior exhibited by some individuals was considered to be an atypical form of anorexia nervosa. During the 1960s, these behaviors were called dietary chaos syndrome, bulimarexia, and dysorexia (Schlundt & Johnson, 1990). In 1980, these behaviors became identified as bulimia. Bulimia's diagnostic criteria include binge-eating and negative affect after binge-eating (Williamson, 1990).

In 1987, the criteria for bulimia nervosa included: (1) repeated episodes of binge eating, (2) lack of control over eating during binges, (3) frequent use of purgative behaviors, self-induced vomiting, laxative/ diuretic abuse, restrictive dieting/fasting, or excessive exercise to prevent weight gain, (4) binge frequency occurring twice a week for 3 months, (5) and a persistent overconcern with body shape and weight (Williamson, 1990). Many similarities exist

between anorexia and bulimia nervosa. Similar to anorectics, bulimics also use food as a coping mechanism from feelings and fears. Bulimic individuals' binge-eating episodes are usually triggered by emotional upset and not by physical hunger (Garner & Garfinkel, 1985).

Additionally, both syndromes share commonalities of disturbance of body image and fear of "fatness." Thus, anorectic individuals restrict and may purge through excessive exercises whereas bulimic individuals binge and then purge through self-induced vomiting or laxative/diuretic abuse (Brownwell & Fairburn, 1995).

Bulimia nervosa also has physical, psychological, and behavioral consequences. The physical consequences of bulimia nervosa include fatigue, lethargy, and feeling "bloated." Other symptoms of bulimia nervosa may include nausea, constipation, abdominal pain, tooth sensitivity, and irregular menses (Mitchell, 1995).

Root, Fallon, and Freidrich (1986) have noted that psychological characteristics of bulimia also include submissiveness, passivity, lack of assertiveness, and an external locus of control. Other psychological symptoms experienced by bulimic individuals include feeling out of control, depression, low self-esteem, and a poorly defined sense of self. Many times bulimic individuals are out of touch with their anger, fear, or anxiety.

Bulimic individuals may also be extremely sensitive to criticism and approval. They tend to be somewhat

preoccupied and obsessed with food, weight, and physical appearance. Depression and anxiety are also commonly experienced by bulimic individuals (Root et al., 1986).

Behavioral consequences of bulimia nervosa include low energy, preoccupation with food, and eliminating consumed food. Bulimic behavior may involve the rapid consumption of a great deal of food in a small period of time. A binge may also be defined as "picking" at food over a long period of time. Once this food is consumed, bulimics purge through self-induced vomiting and/or laxative abuse. Many times following a meal, individuals isolate themselves from others thereby providing the opportunity "to purge" the excessive calories from their systems (Mitchell, 1995).

Factors Contributing to Eating Disorders

There appears to be no single specific etiology for eating disorders. McFarland (1995) suggests that multiple variables increase the risk of individuals developing eating disorders. She believes that the more commonly accepted risk factors can be summed up under the four following kinds of variables (McFarland, 1995).

1. Sociocultural Variables:

- The thin body ideal is valued and the thin body is seen as symbolizing self-discipline, control, independence, and attractiveness.
- Physical appearance of the body is a measure of female attractiveness and social success.
- Women's role expectations are in conflict: the Superwoman complex.

2. Familial Variables:

- Family is highly achievement oriented and

- perfectionistic.
- Family places great emphasis on appearance and is preoccupied with food, dieting, and bodily functions.
- Family tends to exhibit rigidity, enmeshment, inability to resolve conflicts, and overprotectiveness.
- First- and second-degree relatives have above average incidence of depression and bipolar illnesses, chemical dependency, and eating disorders.
- Dysfunctional family communication patterns often result in coalition among members.
- 3. *Individual Variables*
 - The person is an adolescent female who is slightly overweight.
 - The person has impaired self-concept and general feelings of ineffectiveness.
 - The person has difficulty adapting to the maturational tasks of adolescence.
 - The person has marked cognitive distortions related to shape and weight.
 - The person has an impaired body image and distorted internal cues related to hunger.
 - The person has dysphoria, affective instability, or impulsivity.
 - The person tends toward an obsessional style.
 - The person engages in repeated attempts at dieting.
- 4. *Biological Variables*
 - The person has menstrual irregularity.
 - The person is female (gender).
 - The dysregulation of serotonin results in binge eating of high carbohydrate foods.
 - The mechanism of satiety (cholecystokinin) is impaired.
 - The person has other chemical imbalances in the brain.
 - The effects of starvation alter mood, cognitive ability, and character traits, causing the eating disorder to become more entrenched and resistance to treatment.
 - Restrictive dieting adversely affects satiety cues, which are correlating with binge behaviors, and metabolic rate, which can promote weight gain.
 - Strict dieting and exercise can trigger the biobehavioral processes which result in anorexia.

(pp. 15-17)

Statement of Problem

Proper treatment of eating disorders necessitates

accurate assessment. The bulimics' shame and anorectics' denial many times prevent early treatment and entrenchment of these diseases. Early assessment and accurate diagnosis would assist in effectively treating these individuals. The problem of early, accurate diagnosis exists in treating eating disorders. Existing measures such as the Eating Disorders Inventory (EDI) provide accurate diagnosis when individuals eventually seek out treatment. However, these measures may not identify high-risk individuals or screen for eating disorders in the early stages. Instruments such as the MMPI provide a general assessment of psychopathology. Identifying an eating-disorder pattern would provide clinicians with information to further assess for eating disorders with reluctant clients who may be unable to seek treatment due to their shame or denial.

For years, clinicians have written from their clinical experience about characteristic personality features of anorectic and bulimic women. Some researchers have investigated the personality characteristics of eating-disordered subjects through the use of standardized instruments such as the MMPI (Lilenfeld, 1995). Instruments such as the MMPI provide a great deal of information in a cost-efficient manner. Previous attempts to measure eating-disordered patients on self-report symptom measures such as the MMPI have produced both significant and nonsignificant findings (Anderson & Meeshot, 1992; Pendleton, Moll, Tisdale, & Marler, 1990). To date,

research results remain uncertain about a specific eating-disordered pattern on the MMPI.

Purpose of Study

The purpose for this study is to identify specific patterns significant to the eating-disordered population. Previous patterns identified through prior research on the MMPI and with eating disorders were utilized to formulate specific hypotheses pertaining to the expected scale elevation and/or profile configurations (Pendleton et al., 1990; Rybicki et al., 1989). The results of this study will add to the existing base of knowledge and promote further research surrounding the identification of eating-disordered patients with the MMPI.

Research Questions

Certain code types or configurations characterize symptoms exhibited by persons diagnosed with anorexia and bulimia nervosa. Greene (1980) identifies the "Scarlett O'Hara V," the 4-5-6 configuration, as common among passive-aggressive individuals. Many times anorectic or bulimic individuals are incapable of directly expressing their needs or feelings. The internalized anger experienced by many eating-disordered individuals may be identified on the MMPI from the occurrence of the 4-5-6 configuration.

Recent research found elevations on scales 4 and 6 in the eating-disordered populations (Pryor & Wiederman, 1996). Elevation on scale 4 is indicative of problems with

impulsivity (Graham, 1990; Meyer, 1993). This impulsivity may be characteristic of bulimic individuals who engage in the binge/purge cycle. Moderate elevations on scale 6 may suggest distrust, paranoia, and affective instability (Graham, 1990; Meyer, 1993). It was hypothesized in this research that the 4-5-6 V-shaped configuration would be a significant eating disordered pattern. Additionally, elevations in scales 2 and 7 may reflect the depressive, obsessive, and anxiety symptoms exhibited by some anorectic and bulimic individuals.

The general questions for this research are as follows:

1. Do either anorectic or bulimic individuals differ from the general population?
2. Do anorectic subsamples differ from bulimic subsamples on the MMPI?
3. Are there patterns involving the clinical subscales 4, 5, and 6?
4. Are there significant elevations involving scales 2 and 7?

The research hypotheses are as follows:

Hypothesis 1. A significant proportion of the profiles of anorectic and bulimic individuals will have an elevated T-score of 65 or over on the MMPI Depression scale (2).

Hypothesis 2. Profiles of anorectic and bulimic individuals will have elevated T-scores of 65 or over on

the MMPI psychopathic deviate (4) and paranoia (6) scales which will also be greater than scale 5 thereby resulting in a V-shaped configuration.

Hypothesis 3. Profiles of anorectic individuals will have an elevated T-score of 65 or over on the MMPI Psychasthenia scale (7).

Based on previous research, symptomology of the eating disorders, and symptoms measured in the MMPI, it was believed that these patterns of scale elevations or profile configurations would be significant in this research.

Conceptual Assumptions

There are many similarities between anorexia nervosa and bulimia. Bulimic and anorectic individuals many times use food as a coping mechanism from feelings and fears. Anxiety, stress, and depression are expressed indirectly through eating habits. Anorectics restrict their food intake and may purge through excessive exercise to deal with uncomfortable feelings. Bulimics, on the other hand, attempt to deal with their emotional discomfort by binge-eating on excessive amounts of food and purging through vomiting or laxative abuse. Both individuals have chosen food as the mechanism to indirectly deal with their feelings of discomfort.

These individuals deal with the same issues of depression, anxiety, frustration, anger, and nonassertiveness. Thus, although the underlying issues of

anorexia and bulimia are similar, their expression of these issues may differ through restricting or binge-eating on food. Because the MMPI measures depression, anxiety, anger, and nonassertiveness, it is assumed that anorectic or bulimic individuals would produce a similar pattern on the clinical profile.

Rationale and Theoretical Framework

Attempts have been made to define personality characteristics associated with bulimia and anorexia nervosa, and a central theme in those descriptions is difficulty in the management of aggression and dependency (Pendleton et al., 1990). Clinical reports and family research converge to depict the premorbid personality of restricting anorectics as emotionally restrained, compliant, socially inhibited, and obsessive (Wonderlich, 1995). Certain findings have also emerged from the study of symptomatic bulimics. A variety of personality measures have been employed and describe bulimic individuals as low in self-esteem, interpersonally sensitive, and impulsive. These identified personality characteristics can be measured by certain elevations on the clinical scales or profile configurations of the MMPI and MMPI-2.

Studies using the MMPI to assess bulimic individuals repeatedly reproduce a personality profile associated with poor impulse control, acting-out behavior, and chronic depression (Wonderlich, 1995). This research suggests an

MMPI profile reflecting elevations on scales 2, 4, and 6. Thus, elevations on scales 2, 4, and 6 may reflect a possible bulimic eating-disorder profile on the MMPI.

Anorectic individuals share some of the similar characteristics of depression and passive-aggressive behavior as the bulimic population. Additionally, they exhibit obsessional tendencies that would be reflected on the MMPI by an elevation on scale 7. Therefore, anorectic MMPI profiles may also display obsessional characteristics in addition to other previously mentioned bulimic symptoms producing elevations on scales 2, 4, 6, and 7.

Further investigation of how eating-disordered clients score on measures such as the MMPI is warranted since this instrument assesses much of what the EDI measures and is more commonly used in most clinical settings (Anderson & Meeshot, 1992). The MMPI may be perceived as less threatening to take to the defensive eating-disordered client since it is a more broad, general instrument of personality assessment rather than a specific eating-disorder assessment such as the EDI. Additionally, the MMPI contains several validity scales to screen for response sets and other types of invalid responding. These validity scales may help eliminate any subjects from analysis who are obviously distorting their responses (Lilenfeld, 1995).

Delineation of the Research Problem

Proper treatment of eating disorders includes accurate assessment. The bulimic's shame and anorectic's denial many times prevent early treatment and entrenchment of these diseases. Early assessment and accurate diagnosis may assist in effectively treating these individuals. The problem of early, accurate diagnosis exists in treating eating disorders. Existing measures such as the EDI provide accurate diagnosis when the individuals eventually seek out treatment. However, these measures may not identify high-risk individuals or screen for eating disorders in the early stages. Instruments such as the MMPI provide a general assessment of psychopathology. Identifying an eating-disorder pattern would provide clinicians with information to further assess for eating disorders with reluctant clients who may be unable to seek treatment due to shame or denial.

For years, clinicians have written from their clinical experience about characteristic personality features of anorectic and bulimic women. Some researchers have investigated the personality characteristics of eating-disordered subjects through the use of standardized instruments such as the MMPI (Lilenfeld, 1995). Instruments such as the MMPI provide a great deal of information in a cost-efficient manner. The MMPI/2 allows the clinician to assess the psychopathology and personality characteristics of individuals.

Past MMPI research has found that the clinical scales of 2, 4, and 7 emerge as the most prominent elevations in the eating-disorder population (Prather & Williamson, 1988; Rosch, Crowther, & Graham, 1991). This research has helped further delineate between depressed and severely disturbed anorectic and bulimic subtypes, although no modal 2-point code type for the eating-disorder population has been identified (Root & Freidrich, 1989). Despite these findings, recent research by Pryor and Wiederman (1996) dispute the use of the MMPI-2 as an assessment tool for the eating-disorder population, noting that information obtained by this instrument can be just as easily obtained by a clinical interview. However, it is important to note that the MMPI has more reliability than the clinical interview and requires less direct contact by the therapist. Although the MMPI provides similar types of information as the clinical interview, I propose that given the time constraints imposed by managed care, the MMPI followed by a clinical interview to verify results may provide clinicians with a more accurate screening tool for identification of an eating disorder.

It is the intent of this research to investigate a possible eating-disorder pattern on the MMPI that would provide clinicians with a tool to alert them of the need to further assess for the existence of an eating disorder. Instruments such as the EDI or Eating Attitudes Test (EAT) have been specifically developed for the purpose of eating-

disorder assessment and could be utilized once an eating-disorder pattern has been suggested.

Importance of the Study

Prevalent Problem

According to the DSM-IV (American Psychiatric Association, 1992), an estimated .5%-1.0% of females in late adolescence and early adulthood meet criteria for anorexia nervosa. Individuals who are subthreshold for the disorder (i.e., with eating disorder not otherwise specified) are more commonly encountered. The incidence of anorexia nervosa appears to have increased in recent decades. The prevalence of bulimia nervosa among adolescent and young adult females is approximately 1%-3%.

Some researchers believe that the prevalence of eating disorders is increasing. Pyle, Halvorson, Newman, and Mitchell (1986) surveyed 1,389 college freshmen from the same geographic area studied 3 years previously and found that the percentage of female students who met DSM-III criteria for bulimia had increased from 1% to 3.2%. The American Anorexia/Bulimia Association (1997) reports the following incidence of eating disorders:

1. More than 5 million Americans suffer from eating disorders.
2. It is estimated that 5% of adolescent and adult women have anorexia, bulimia, or binge-eating disorder.
3. One thousand women die each year of anorexia.

4. Five percent of college women are bulimic.

It is evident by existing research that eating disorders are a serious problem affecting numerous lives. Anorexia and bulimia nervosa can become life-threatening illnesses at the extreme, and hazardous to psychological and physical well-being at the minimum. Not only is there concern about the current prevalence of this disorder, but there is also concern about the increased incidence of this disorder (Richter-Reno, 1992).

Accurate Diagnosis and Early Detection of Bulimia

Unlike anorectic individuals, people suffering from bulimia may maintain an average or slightly above average body weight. The differences between these two disorders make diagnosis of bulimia more difficult. The bulimics' shame combined with denial may make early detection and effective treatment difficult. Identifying an eating-disorder pattern in the MMPI would enable clinicians to assess and rule out the existence of an eating disorder early in treatment. Early detection would prevent entrenchment of the disease and increase clients' chance for recovery (Schlundt & Johnson, 1990).

Cost Reduction

Using the MMPI to assess eating disorders may be more cost efficient than employing separate eating-disorder assessments such as the EDI. Being a broad, general

personality assessment, the MMPI contains most of what the EDI purports to measure (Anderson & Meeshot, 1992). The MMPI may also provide clinicians with additional information that would help them treat the client more effectively.

As our health care system becomes more managed and moves toward socialized medicine, it becomes increasingly important to provide physicians with methods to ensure that appropriate referrals are made in spite of bulimic individuals' desire to maintain secrecy surrounding their disease. Utilization and interpretation of the MMPI may prove to be an effective diagnostic tool in the assessment and referral process of eating-disordered individuals. Providing general practitioners with enough information to assess for eating disorders may mean the difference of individuals being identified early on for appropriate referrals and effective treatment (Schlundt & Johnson, 1990).

Definitions of Terms

Anorexia and Bulimia Nervosa

Anorexia and bulimia nervosa are classified as a mental illness since it has become evident that these disorders possess psychological features such as depression and anxiety that contribute to the development and progress of the diseases (Ramos Regardie, 1994). Both types of eating disorders also include preoccupation with body

weight and shape (Pryor & Wiederman, 1996). The diagnostic criteria for anorexia and bulimia nervosa are provided in the appendix of this paper.

The criteria for diagnosis of anorexia nervosa include (1) a refusal to maintain body weight over a minimal normal weight for age and height, (2) intense fear of gaining weight, (3) disturbance in body image, and (4) absence of three consecutive menstrual cycles in females when otherwise expected to occur (Ramos Regardie, 1994). The restricting-type anorectic does not regularly engage in binge-eating or purging behavior but rather relies on adhering to a strict diet and caloric intake to prevent weight gain. The binge eating/purging-type anorectic regularly engages in binge-eating or purging behavior to maintain low desired weight or to prevent weight gain.

The diagnostic criteria for bulimia nervosa include (1) recurrent episodes of binge eating or feeling out of control over eating behavior, (2) the use of self-induced vomiting, laxatives, diuretics, fasting, or vigorous exercise in order to prevent weight gain, (3) persistent concern with body shape/weight, and (4) a minimum average of two binge-eating episodes a week for at least 3 months. The purging-type bulimic regularly engages in self-induced vomiting or the misuse of laxatives, diuretics, or enemas. The nonpurging-type bulimic uses other inappropriate compensatory behaviors such as fasting or excessive exercise, but does not regularly engage in self-induced

vomiting or laxative abuse.

Delimitations

Three delimitations guide this research:

1. The MMPI rather than MMPI-2 data were utilized in this research since the consulting psychologist at the HOPE program used the MMPI in assessing eating disorders and diagnosis.

2. Male subjects were excluded from this sample since the majority of subjects in the HOPE program consisted of female patients.

3. All subjects used in this research sought out treatment at the Healthy Options for Problem Eaters (HOPE) program, therefore implying that they all suffered from some type of disordered eating patterns.

Overview

In order to provide background for the present research, several areas of literature on eating disorders and personality characteristics were reviewed. Some of the specific measures used to assess eating disorders, particularly the self-report and clinical interview format, were also discussed. In chapter 2, the literature review focuses on studies that utilized the MMPI/MMPI-2 as the primary assessment instrument in the eating-disorder population. Studies that compare the MMPI results of eating-disordered women to other disordered groups (schizophrenia, addictions, depression, therapy clients)

and assess the personalities of different eating disordered groups (anorectic, bingers, purgers) are presented. Research regarding the personality features of eating-disordered women is also discussed.

This review of literature on the MMPI in eating-disordered assessment should provide a sufficient background from which to present the current study of identification of an eating-disorder pattern in the MMPI. The present research focused on the MMPI profiles of an eating-disordered female population. The goal of this research was to identify significant configurations or scale elevations on the MMPI profiles for individuals who suffered from anorexia and bulimia nervosa.

Following this, chapter 3 focuses on the sample that was studied, the operational definition of anorexia nervosa and bulimia nervosa, as well as descriptions of the MMPI clinical scales. Further clarifications of the hypotheses and analysis of this research project are also presented. Chapter 4 discusses the statistical analysis of the data studied, and chapter 5 presents conclusions and recommendations for further study.

CHAPTER II

REVIEW OF LITERATURE

The increasing prevalence of eating disorders has become important to clinicians and researchers (Richter-Reno, 1992). Research has provided the clinician with helpful diagnostic criteria and treatment modalities. Numerous eating-disorder assessment tools have also been developed to aid in accurate diagnosis. However, many times individuals are not identified with an eating disorder until entrenchment of the disease. Identifying individuals at risk for the disorder through use of a screening device may help prevent the development of an eating disorder or entrenchment of the disease.

Eating-disorder self-report questionnaires are briefly reviewed to identify the need for a screening device such as the MMPI. Identifying the need for a screening device in the eating-disorders assessment literature in addition to reviewing pertinent research on the MMPI and eating-disordered population provides support for the possible existence of an eating-disorder pattern occurring on scales 4-5-6.

Difficulty of Early Detection in Eating Disorders

Brownwell and Fairburn (1995) identify the following obstacles for victims seeking treatment:

1. The person suffering from the disorder does not view it as a problem. This attitude appears to be especially common among individuals with anorexia nervosa. As a result it is often concerned others who persuade the sufferer to seek help.
2. The hope that the problem will go away of its own accord. In some cases this will indeed happen. Little is known about the natural history of anorexia nervosa and bulimia nervosa, so it is not possible to identify in advance those cases with a benign course ahead of them.
3. Some people think that their eating problem is not sufficiently severe to merit treatment or that they do not deserve help.
4. Shame, guilt, and secrecy are common among people with bulimia nervosa. By seeking treatment, sufferers run the risk of others finding out about the problem and the years of deceit and subterfuge that may have been required to keep it hidden.
5. Difficulty telling doctors. Previous problems (e.g., menstrual or gastrointestinal problems, depression, or low self-esteem) for which a doctor was consulted may actually have been a result of the eating problem, yet the doctor was not informed of their true cause. Some people go to their doctor planning to divulge the problem but lose their nerve at the last moment.
6. Fear of treatment. It is common for people with anorexia nervosa or bulimia nervosa to be concerned that treatment will involve weight gain.
7. Financial barriers to seeking help. (p. 291)

Significance of Early Detection in Eating Disorders

Many times the disease is severely entrenched by the time victims seek treatment. Early diagnosis and treatment of eating disorders is desirable to prevent entrenchment of these diseases. Brownwell and Fairburn (1995) note that duration of the disorder may be decreased by reducing the

time between the disease's onset and presentation for treatment.

Slade and Dewey (1986) also stress the value of early identification and treatment. There is general agreement in the literature that the longer the time interval between the development of an eating disorder and treatment intervention, the poorer the outcome (Morgan & Russell, 1975; Pierloot, Wellens, & Houben, 1975). Thus, an important role exists for a screening instrument that will identify individuals at risk of developing eating disorders. Once identified, early intervention would at least be feasible and, it is hoped, successful (Slade & Dewey, 1986).

Eating-Disorder Assessments

Attempts to accurately assess eating disorders have resulted in many different types of eating-disorder instruments. Although these instruments have utility in pinpointing eating disorders once they have already been suspected, an accessible, affordable general screening instrument is still needed for early detection of eating disorders. Because of the multifaceted nature of eating disorders, other components of an accurate assessment of eating-disorder assessment include observational, self-monitoring, body image, and dieting behavior.

For purposes of this research, self-report measures specific to eating disorders are reviewed in order to identify the need for a screening tool for eating disorders

and the appropriateness of the MMPI as a possible screening instrument in the assessment of eating disorders. It is not my intent to suggest that a self-report instrument such as the MMPI is sufficient to accurately diagnose eating disorders. Nevertheless, a screening instrument such as the MMPI may provide information relevant to warrant further assessment with the eating-disorder self-report instruments to confirm or rule out the existence of eating disorders.

Self-report measures in eating-disorder assessments have improved tremendously over the past several years. Instruments of many different types have been devised in attempts to accurately assess eating disorders (Rosen & Srebnik, 1990). These instruments are briefly reviewed to provide the foundation for the appropriateness of the MMPI as a screening tool for eating-disorder assessment.

The two most widely used, standardized, self-report measures which tap into eating behaviors and attitudes that are typical of eating disorders are the EAT (Garner & Garfinkel, 1979) and the EDI (Garner, Olmsted, & Polivy, 1983). The EAT scale has appeared in 40-item and 26-item versions. Originally, this scale was developed as a way to diagnose anorexia nervosa in epidemiological studies. However, this scale has proven to be a measure of anorectic attitude rather than a measure of actual behavior. The EDI is a measure designed to assess psychological characteristics relevant to both anorexia and bulimia nervosa.

In 1991, the EDI was revised to the EDI-2. The EDI-2 provides an assessment of the psychological and behavioral characteristics of eating disorders. The EDI-2 also includes Drive for Thinness, Bulimia, Ineffectiveness, Interpersonal Distrust, Perfectionism, Interoceptive Awareness, and Maturity Fears subscales. Additionally, the EDI-2 has three scales not in the original EDI: Social Insecurity, Impulse Regulation, and Asceticism.

Williams, Schaefer, Shisslak, Gronwaldt, and Comer (1986) compared the accuracy of the EAT, the EDI, and a structured clinical interview in identifying people who potentially have an eating disorder. Seventy-two adolescent females were diagnosed using the structured interview, with 54 considered normal, 9 as dieters, 8 as suspected bulimics, and 1 as bulimic. More differences were shown on the EAT than the EDI. Eighty-six percent of the subjects were correctly classified using a discriminant analysis of the total EAT score along with three items from the EAT and four items from the EDI. Classifying dieters as "normal" produced the greatest number of errors. Of the eight members of the suspected bulimic sample, five were correctly classified. Raciti and Norcross (1987) performed a similar study, comparing the EAT and the EDI and found both assessments to give similar results in the classification of weight-preoccupied college students.

Other standardized self-report measures which tap into eating attitudes and behaviors that are typical of eating

disorders include the Binge Scale (Hawkins & Clement, 1980), the Binge Eating and Cognitive Factors Scale (Gormally, Black, Daston, & Rardin, 1982) and the Bulimia Test (BULIT) (Smith & Thelen, 1984). The BULIT-R was developed in 1991 in response to changes in diagnostic criteria for bulimia nervosa (Thelen, Farmer, Wonderlich, & Smith, 1991).

Each of these measures has been shown to be sensitive to treatment outcome with anorexia or bulimia nervosa, to have acceptable internal consistency, and to have adequate concurrent or discriminant validity (Garner & Garfinkel, 1979; Garner & Olmsted, 1984; Raciti & Norcross, 1987; Rosen, 1987; Toner, Garfinkel, & Garner, 1987; Wilson, Rossiter, Kleinfield, & Lindholm, 1986). Test-retest reliability is supported by the original reports of the EAT, EDI, BULIT, and Binge Eating and Cognitive Factor Scale (Rosen & Srebnik, 1990).

The EAT, EDI, BULIT, and Binge Eating and Cognitive Factor scales provide rating scales for the frequency of binge eating, laxative use, vomiting, and subjective distress following eating. Despite these similarities, there are notable differences. The EAT and Binge Eating and Cognitive Factors scales also include items related to food avoidance. The EAT has three empirically derived scales: Bulimia and Food Preoccupation, Dieting, and Oral Control (measures finicky eating and pressure from others to gain weight). The EAT also discriminates anorexia nervosa patients from normal controls (Gross, Rosen, Leitenberg, &

Willmuth, 1986). The Binge Eating and Cognitive Factors Scale taps into the tendency toward overeating after rigid rules for dieting are broken. This issue of binge eating is relevant to bulimia (Rosen & Srebnik, 1990).

Limitations of all of these scales include the lack of precise quantification of symptoms that is needed for diagnosis and measurement of treatment outcome.

Additionally, the definition of binge-eating has also been an issue for years until recent clarification in the DSM-IV. Individuals taking the assessment may distort the concept of binge. Anorectic and bulimic individuals define this term in very different ways. Although these scales provide a general index of binge eating and vomiting severity, clinical interviews and/or food diaries provide the precise estimates of eating and purging behaviors necessary for adequate diagnosis and treatment (Rosen & Srebnik, 1990).

These scales provide direct measures of the eating-disorder symptoms or behaviors of individuals currently presenting with eating disorders. Thus, these instruments are capable of identifying only people who have already developed an eating disorder. Early identification, or effective prevention, requires the recognition of people who are likely to develop an eating disorder before the overt symptoms manifest themselves (Slade & Dewey, 1986).

Additionally, these scales were also designed to assess eating-disorder treatment. Therefore, the questions are symptom specific and transparent. Because of its

transparency, this assessment tool is not a good screening device. An objective, self-report personality measure such as the MMPI, which is accessible, well researched, and affordable, is needed to screen out individuals who warrant additional assessment.

Schlundt and Johnson (1990) recommend using one or two objective tests to provide a multidimensional profile of psychopathology to use with all patients to screen for severity of psychological distress. Identifying existing psychopathology is crucial to effective treatment. This recommendation provides support for use of the MMPI since some of the psychological states, such as depression, anxiety, and passive-aggressive tendencies, are common symptoms of co-morbid disorders present in patients with eating disorders.

In treating eating disorders, the MMPI can be utilized as an initial screening instrument that can alert clinicians to areas of potential distress and psychopathology. A 4-5-6 profile might alert clinicians to the possible existence of an eating disorder. From the information provided by the MMPI, clinicians could further assess for an eating disorder by utilizing the previously mentioned self-report instruments.

MMPI and Disordered Groups

Various groups such as schizophrenics, alcohol/substance abusers, incest survivors, binge eaters, and

clinically depressed individuals have been compared to eating-disordered subjects on the MMPI. These studies are briefly reviewed to provide the foundation for the use of the MMPI as a screening instrument for eating disorders.

Much of the early research surrounding the MMPI and eating disorders compares eating-disordered women to other disordered groups. Small et al. (1981) were among the first to use the MMPI to analyze anorectic individuals' personality organization. They compared anorectics to schizophrenics on the MMPI. Both groups showed elevations on clinical scales 2, 4, 6, 7, and 8, but no significant differences between the two groups were found when the clinical scale mean scores were compared. From the similarity between the two groups, the authors suggested "the potential of a chronic thought disorder" (Small et al., 1981, p. 736).

Verberne (1984) critiqued Small et al.'s (1981) interpretation of their MMPI data by comparison of mean scale scores. Verberne's (1984) profile analysis produced a mean code type for the anorectic group as "2-8" at T-score elevations of 75.8 and 72.92 respectively, whereas for the schizophrenic group the code type was "8-6" at T-score elevations of 82.07 and 77.81 respectively. The primary differential diagnosis for the "8-6" profile is schizophrenia, whereas the diagnosis for the "2-8" is affective disorder (Graham, 1990).

Lilenfeld (1995) also noted that when examining the

two mean profiles there is a 10-point difference between the schizophrenics' scale 8 and scale 7 scores. This 10-point difference would suggest a schizophrenic disorder, whereas the anorectic's peak score on scale 2 combined with a difference of less than 2 points between scales 8 and 7 may suggest more of an affective disturbance rather than a psychotic disorder. Other limitations of this research include the inpatient status of the subjects and the small sample size of 14 anorectic females. These factors may influence the generalizability of this study to anorectic individuals outside the inpatient population (Ramos Regardie, 1994).

Hatsukami, Owen, Pyle, and Mitchell (1982) also utilized the MMPI as an objective measurement of hypothesized personality similarities between two groups of disordered women. They compared the MMPI profile of women suffering from either bulimia or drug abuse problems. They hypothesized that the personality characteristics of women with bulimia would be similar to characteristics of women addicted to other substances. The MMPI 49-item MacAndrew Alcoholism scale (MAC) scores were also analyzed. The alcohol and drug-abusing group demonstrated higher scores than the bulimic group on nearly all scales, including the MAC, when the mean scale scores were analyzed.

Hatsukami et al. (1982) also examined overall profiles. Elevations on scales 2, 4, 7, and 8 were demonstrated by both groups. Bulimic women exhibited

T-scores of 70.9 (scale 2); 70.6 (scale 4); 67.0 (scale 7); and 67.9 (scale 8). Women with alcohol or drug-abuse problems exhibited T-scores of 71.9 (scale 2); 78.9 (scale 4); 70.8 (scale 7) and 75.7 (scale 8). This type of profile suggests problems with depression, impulsivity, anxiety, social withdrawal, and disturbed thinking. Examination of mean code types for the bulimic sample showed a "2-4" code type indicative of possible symptoms of depression, characteristics of argumentativeness, unpredictability, and interpersonal relationship difficulties. The mean code type of "4-8" suggested characteristics of being unpredictable, impulsive, and acting out (Hatsukami et al., 1982).

Scott and Thoner (1986) conducted studies that compared anorectic individuals to sexually abused individuals. They focused on the differences between anorectic and incest survivors. The female subjects included a group of 30 inpatient anorectic patients (using the DSM-III criteria, APA, 1980), a group of 30 incest survivors (all in therapy), and a control group of 30 subjects with no history of sexual abuse or eating disorders.

The authors performed univariate analysis of variance on the 13 standard MMPI validity and clinical scales utilizing the non-K-corrected raw scores. Significant differences ($p < .05$) were found on scales F ($F = 17.14^*$), K ($F = 13.29^*$), 1 ($F = 14.75^*$), 2 ($F = 25.53^*$), 3 ($F = 10.32^*$), 4 ($F = 13.29^*$), 6 ($F = 13.15^*$), 7 ($F = 19.22^*$), 8

($F = 24.06^*$), 9 ($F = 25.15^*$), and 0 ($F = 7.66^*$).

Significant differences between groups were identified through the Duncan procedure ($p < .05$). The incest and anorectic groups were homogenous and significantly different from the control group on scales F, Es, 4, 6, 7, 8, 9, and 0. These results confirmed Scott and Thoner's hypothesis that anorectic and incest survivors were not different on scales 4 and 8 but were significantly different from the control group on these scales.

There were some differences between the anorectic and incest groups. The anorectic scores were more elevated on scales 1, 2, and 3 than were the incest survivors. The anorectic individuals tended to displace emotional tension into somatic obsession with weight evident by elevations on scale 1. The anorectic group's elevated scale 2 scores may reflect depression. The elevation on scale 3 for the anorectic group may have represented the ego defense mechanism of denial and repression exhibited through characteristics of hysteria (Scott & Thoner, 1986). Despite these elevations, it is important to report that the overall mean profiles for all three groups fell within normal limits. Thus, although there were no significant elevations in this research, the identified difference between the profiles was an important finding.

These findings may be generalizable to other inpatient anorectic groups given the sample size of 30. This research also provided additional insight into personality

characteristics of anorectics. As noted by Scott and Thoner (1986), caution must be taken in terms of the effect of patient status (inpatient vs. outpatient) on the study's results (Richter-Reno, 1992).

Leon, Lucas, Colligan, Ferdinande, and Kamp (1985) assessed general adjustment in subjects diagnosed by the DSM-III (APA, 1980) criteria for anorexia nervosa by analyzing MMPI data of 31 adolescent females. Subjects were assessed at the admission and discharge of their hospital visit. Treatment consisted of individual therapy, family therapy, and a designated person who supported and encouraged the anorectic individual to increase her food intake. Twelve of the anorexia nervosa group were of the bulimic-purging subtype and 19 were of the restrictor subtype. Binge-purger anorectics were compared to a control group of 37 normal-weight females who had no history of an eating disorder. The control groups were generally matched to the anorectic group according to socioeconomic status and age.

At admission, statistically significant differences existed between the bulimic and restrictor anorectic on the MMPI. The anorectic restrictor's mean scores were higher on the L scale ($T = 48.02$), whereas the bulimic anorectic mean scores were higher on scales 4 ($T = 61.00$) and 6 (65.10). The bulimic anorectic group appeared to be more impulsive and demonstrated disturbed thinking. Following the treatment, the anorectic group exhibited a less pathological

profile on MMPI scales 1, 2, 3, 6, 7, 8, and 0, evident by decreases in somatic concerns, depression, anxiety, and general cognitive preoccupations.

Since subjects returned completed forms by mail to the investigator, questions arise concerning the method of data collection on research results. Concerns arise about the impact that uncontrolled environmental factors and required parental consent may have had on the test results. The generalizability of these results is also questionable with individuals other than the adolescent female population examined (Leon et al., 1985).

Rosch et al. (1991) also compared eating-disordered women to a non-eating-disordered group of women who did not participate in therapy and a non-eating-disordered group of women who did participate in therapy. The MMPI profiles of 38 undergraduate women with significant elevated scores on the BULIT were identified and compared to 38 non-eating-disordered women receiving psychotherapy and 37 non-eating-disordered women not receiving psychotherapy.

Although none of the group's mean scale scores reached clinically significant elevations (T scores of 70 or greater), the identified "bulimic" group of individuals with significant BULIT scores obtained higher scores on the MMPI clinical scales 1, 7, 8, and 9 than both comparison groups. The "bulimic" sample produced 89/98, 27/72, 48/84, and 69/96 as the most frequent 2-point code types, which suggested that these women may be dysphoric, anxious, perfectionistic,

and have low self-esteem and unusual thoughts (Rosch et al., 1991).

From these 2-point codes, Rosch et al. (1991) also suggested that these MMPI results possibly identify the existence of two subgroups within their "bulimic" sample. The 27/72 code-type individuals were characterized as anxious, rigid, perfectionistic, or depressed. The remaining three code types (89/98, 48/84, 69/96) compose a subgroup of character-disordered bulimics who may exhibit emotional lability, distorted thinking, impulsivity, and avoidance of intimacy (Rosch et al., 1991). Rosch et al. (1991) conclude that these MMPI findings are specific to a bulimic eating-disordered group rather than general characteristics of any disordered group because of using a group with psychological problems other than eating disorders in addition to a "normal" control group.

A possible weakness in this research includes the criterion used to identify the bulimic sample. "Bulimic" individuals were identified through their scores on the BULIT measure. No other form of assessment, such as a interview format, was utilized. Interviews are a crucial part of an eating-disorder assessment since the individual's denial may prevent accurate self-report. The omission of an interview, therefore, is a weakness in this study's methodology (Lilenfeld, 1995). Another weakness in Rosch et al.'s (1991) research is that issue of comorbidity is not addressed. Scale elevations are assumed to be caused by the

eating disorder rather than a comorbid diagnosis. Additionally, it is important to remember that none of the profiles reached clinical significance (T-score of 70 or greater). Thus, the identified code types must be interpreted in light of the fact that they did not reach clinical significance.

Biederman, Habelow, Rivinus, Harmatz, and Wise (1986) compared anorexia nervosa inpatients to individuals diagnosed with non-bipolar major depression (depressed). The sample consisted of 35 female patients from Boston Children's Hospital Medical Center (n = 22) and the Eating Disorders Unit (n = 7 outpatient and 6 inpatient), Child Psychiatry Service, Massachusetts General Hospital in Boston. Demographic and clinical characteristics of patients were similar across treatment settings. The control group consisted of 25 volunteers who were screened to exclude any medical or psychiatric disorders.

MMPI profiles were compared between these groups, as well as when all patients were combined together to produce one mean profile. The depressed group (individuals with nonbipolar major depression) of anorectic individuals had elevations (T-score of 70 or greater) on six of the clinical scales (2, 3, 4, 6, 7, and 8), whereas the nondepressed group of anorectic individuals had no significant elevations on the clinical scales. When anorectic patients with major depression were compared to anorectic individuals without major depression, significant

(T-score of 70 or greater) differences were found in the number of subjects who exhibited elevations on three, four, or five of the clinical scales.

The findings indicated that anorexia nervosa patients with a current episode of major depression significantly differed from the anorexia patients without major depression in all but two MMPI clinical scales (5 and 9). Thus, many of the depressed anorectics exhibited clinically elevated scale scores (T-scores of 70 or over). These results suggested that the depressed anorectic individuals appeared more psychologically disturbed on the MMPI than the non-depressed anorectic individuals. When compared to the non-depressed anorectic individuals, the MMPI profiles of the depressed anorectic individuals displayed a much broader range of psychopathology (Lilenfeld, 1995; Ramos Regardie, 1994).

One issue of concern in this research is that it is difficult to determine what role anorexia plays, if any, in the onset of depression. Did the anorexia nervosa cause the depression? Did the depression produce the anorexia nervosa? or Did a comorbid diagnosis exist? Past research has found depressive symptoms in anorectics without the subjects meeting the criterion for depression (Casper, Hedeker, & McClough, 1992; Eckert, Goldberg, Halmi, Casper, & Davis, 1982; Pierloot et al., 1975; Scott & Baroffio, 1986; Scott & Thoner, 1986; Skoog, Andersen, & Laufer, 1984; Small et al., 1981).

MMPI and Eating Disorders

Information about eating disorders and the MMPI emerged by comparing the eating-disordered population to other groups. Continued research gradually focused on specific characteristics of the eating disorders rather than how they were similar or different from other identified groups. MMPI research gradually shifted its focus from group comparisons to personality attributes in the eating-disorder population. These studies are briefly explored to provide information about the appropriateness of identifying an eating-disorder pattern in the MMPI.

Dyken and Gerrard (1986) compared the MMPI profiles of purging bulimics by using two nonbulimic control groups. The first control group consisted of women who were satisfied with their weight and had not dieted in the year prior to the research. The second comparison group consisted of women who engaged in repeated dieting attempts but not bulimic behaviors. Dyken and Gerrard (1986) found the MMPI clinical scales 4 and 9 as the most discriminating variables among the three groups. For each clinical scale, the highest scores were exhibited by the bulimic subsample, repeat dieters, and the nondieting control group. However, none of the mean clinical scale scores were elevated at a clinically significant level (mean T-score of 70 or higher), as would be expected with a nonclinical sample.

The use of two nonbulimic control groups provides strong support for the MMPI characteristics found to be

associated with the bulimic population. It appears from this research that elevations on scale 4 may be associated with bulimia. Yet, once again, the issue of comorbidity is not addressed. Additional research on the MMPI clinical scales and comorbidity is warranted in the eating-disordered population to identify particular patterns existing in the eating-disordered population on the MMPI.

Casper et al. (1992) assessed personality features using the MMPI with an inpatient population of bulimic patients, bulimic-anorectic patients, restricting anorectic patients, and a control comparison group of 19 healthy females. The authors of this research did not provide a table of means for the validity and clinical scales but utilized a figure of the group profiles to display their results.

The bulimic sample exhibited the highest overall mean MMPI profile elevation of all groups. The bulimic sample displayed clinically significant scores (T-score of 70 or more) on scales 2, 4, 7, and 8. The bulimic-anorectic's group profile showed clinically significant elevations (T-score of 70 or more) on scales 2 and 4. The restricting anorectic's mean profile was least elevated and exhibited clinical elevations (T-score of 70 or more) on scales 2 and 0. The control group displayed a profile that fell within normal limits (T-scores between 35-70). The authors concluded that the bulimic group revealed a more expressive profile whereas the restricting anorectic group revealed a

more depressive profile (Casper et al., 1992).

Casper et al.'s (1992) research provides some interesting information about potential differences between anorectic and bulimic individuals. However, it is difficult to know if these differences are attributed to the eating disorder or are the result of another diagnosis such as depression.

Norman and Herzog (1983) conducted one of the earliest studies of personality features of eating-disordered women using the MMPI. They compared the MMPI profiles of 39 outpatient females classified into three eating-disordered groups of restricting anorectic, bulimic-anorectic, or normal-weight bulimic. When mean scale scores for the three groups were compared, the bulimic and bulimic-anorectic yielded significantly higher means than the restricting anorectic group on scale 4. Further analysis of the percentage of subjects endorsing each subscale for scale 4 revealed that normal-weight bulimic subjects had more elevated scores than did subjects in either of the anorectic groups on the two subscales assessing "antisocial behavior and attitudes" and "troubled family relations."

Norman and Herzog (1983) also analyzed the code type for each group. The restricting anorectic group had only marginally elevated clinical scale scores (scale 2 mean T-score of 76.60, and scale 8 mean T-score of 69.70), whereas the bulimic-anorectic group had the most elevated T-scores (scales 1, 2, 3, 4, 6, 7, and 8 mean T-score of 70 or

greater). The bulimic group had elevations on scales 2 (72.00), 4 (80.29), and 8 (70.21). From these findings it appears that the greatest confidence can be placed on the descriptors associated with the bulimic-anorectic profile (Norman & Herzog, 1983).

The elevated scale 2 scores for all three eating-disordered groups suggest the presence of depression. The additional elevation of scales 4 and 8 in the bulimic profile of 2-4-8 may indicate a sense of alienation and irritability (Norman & Herzog, 1983). The profile of "4-2" exhibited by the normal-weight bulimic group may be characterized by a poor impulse control, low tolerance for frustration, and acting-out behavior (Norman & Herzog, 1983).

The restricting anorectic group "2-8" profile suggests tendencies toward alienation, anxiety, depression, and withdrawal. These individuals often fear losing control over their impulses and tend to avoid close interpersonal relationships (Norman & Herzog, 1983). When comparing the mean code types, the personality differences between the bulimic-anorectic, normal-weight bulimic, and restricting anorectic eating-disordered groups become clearer. From the profile elevations on the MMPI, it appears that the bulimic-anorectic group appeared most disturbed, whereas the restrictor anorectic group appeared least disturbed.

Shisslak, Pazda, and Crago (1990) studied 146 females by comparing bulimic women from underweight, normal weight,

and overweight categories to nonbulimic underweight, normal weight, and overweight women. The population sampled was not significantly different in family income, education, height, or age. Confounding of the research results with treatment variables was prevented by having the subjects recruited from the eating-disorders clinic complete the test battery before receiving psychological treatment (Richter-Reno, 1992). Shisslak et al. (1990) did not provide a table of means but also displayed her results in six different MMPI profiles.

The underweight bulimic women exhibited the greatest amount of psychopathology on the MMPI with elevations on scales 3, 4, 5, 7, and 8 with T-scores of 70 or greater, followed by the overweight bulimics with elevations on scales 2 and 4 (T-score of 70 or greater). The nonbulimic underweight subjects exhibited one scale elevation on scale 0 (T-score of 70 or greater). The normal and overweight nonbulimic groups exhibited no clinically elevated scales on the MMPI (Shisslak et al., 1990).

The underweight nonbulimic group displayed lower scores than the other five groups on scales 3, 4, and 7 (T-score < 50). They also exhibited lower scores on scale 8 than all of the other groups except the normal control group (Shisslak et al., 1990). However, it appears from the profile used to display this study's results that scale 8 was low compared to the other groups but still within normal limits.

The mean MMPI profiles of the underweight bulimic group resembled a defensive profile that was consistent with the denial exhibited by the typical restrictor anorectic who denies having any psychological problems or being too thin even when she is emaciated. The striking differences in psychopathology between the underweight bulimic and underweight nonbulimic groups support previous research that has indicated important differences between anorectics with bulimic symptoms and anorectics without such symptoms (Norman & Herzog, 1983).

Limitations of the study relate to the use of college students as subjects. Thus, generalization of the findings to other populations is questionable. Another issue of concern in this research is that the binge-purge behaviors were not clearly defined. As previously discussed, the definition of binge can be subjective and needs to be clearly defined for accurate assessment and diagnosis (Ramos Regardie, 1994).

Pendleton et al. (1990) studied the 4-5-6 configuration on the MMPI. This configuration for females has been associated with problems in the direct expression of anger, dependency, and affectional needs (Greene, 1980). Since these issues are characteristic of bulimic women, Pendleton et al. (1990) hypothesized that the incidence of the 4-5-6 configuration would be greater for bulimic women ($n = 26$) than for the female outpatient population ($n = 40$) or nonpsychiatric group ($n = 31$). The bulimic and

outpatient groups exhibited higher elevations on scales 4 ($T = 75.7, 71.9$, respectively) and 6 ($68.2, 64.3$, respectively) than the nonpsychiatric group ($44.2, 45.7$, respectively). No significant differences were found on scale 5 between the groups ($44.2, 46.4, 45.7$).

Pendleton et al. (1990) did not find the predicted differences in the incidence of the 4-5-6 configuration when they analyzed the configuration as a discrete variable. However, when the characteristics were measured as a continuous variable, the nonpsychiatric population differed significantly from both clinical populations. It is uncertain if the difference between the psychiatric or nonpsychiatric population could be explained by comorbidity.

Summary of MMPI Research and Eating Disorders

As evident by the research on the MMPI and eating disorders, researchers have used this personality measure to further their understanding of the personality features of women suffering from eating disorders. Various groups such as schizophrenics, substance/drug abusers, incest survivors, major depressive disorder, and other clinical populations have been compared to anorectic or bulimic subjects. These comparison groups have helped to reveal personality characteristics specific to bulimic or anorectic patients (Lilenfeld, 1995).

Table 1 summarizes the scale elevations or code types identified in the eating disorder research.

TABLE 1
SUMMARY OF MMPI AND EATING-DISORDERS RESEARCH

AUTHORS	Validity Scales			Clinical Scales									
	L	F	K	1	2	3	4	5	6	7	8	9	10
Small et al. (1981)					X		X		X	X	X		
Hatsukami et al. (1982)					X		X			X	X		
Leon et al. (1985)	X						X		X		X		
Biederman et al. (1986)					X	X	X		X	X	X		
Casper et al. (1992)					X	X	X		X	X	X		X
Norman & Herzog (1983)		X		X	X	X	X		X	X	X		
Shisslack et al. (1990)						X	X	X		X	X		
Pendleton et al. (1990)							X		X				

Research results pertaining to the existence of an eating-disorder pattern on the MMPI remain equivocal. Past research has found that when mean profiles for bulimic subjects were examined, typically scales 2, 4, 7, and 8 were elevated (Bulik, Beidek, Duchmann, Weltzin, & Kaye, 1992; Hatsukami et al., 1982; Kolotkin, Revis, Kirkley, & Janick, 1987; Norman & Herzog, 1983). Scales 2, 4, 6, 7, and 8 were also often elevated among anorectic subject samples (Biederman et al., 1986; Casper et al., 1992; Norman & Herzog, 1983; Scott & Baroffio, 1986; Scott & Thoner, 1986; Shisslak et al., 1990; Small et al., 1981). These elevations suggest possible problems with depression, impulsivity, anxiety, social withdrawal, and disturbed thinking among bulimic women. In addition to these symptoms, anorectic women may experience problems of hypersensitivity and excessive rigidity (Lilenfeld, 1995).

There appears to be consistency on certain scale elevations among studies that may identify an eating-disorder pattern. Findings from past research support the existence of a possible V-shaped eating-disorder pattern with elevations on scales 4 and 6 (Norman & Herzog, 1983; Pendleton et al., 1990; Shisslak et al., 1990). Additionally, elevations on scales 2 and 7 (Biederman et al., 1986; Casper et al., 1992; Norman & Herzog, 1983; Scott & Baroffio, 1986; Scott & Thoner, 1986; Small et al., 1981) may also reflect the symptoms of depression and obsessional-type thinking commonly experienced by a

subgroup of the eating-disordered population.

The issue of comorbidity not being addressed in these studies appears to be a major weakness in past research. Comorbidity may explain the equivocal findings of past research in attempting to identify an eating-disorder profile or configuration. It is important to note the influence of comorbidity when attempting to identify an eating-disorder pattern on the MMPI. Since the MMPI is a general measure of psychopathology, the issue of comorbidity can be identified as well as addressed in the present research.

In addition to screening for general psychopathology (Williamson, 1990), the MMPI may be appropriate to screen for the existence of eating disorders. The purpose of this research is to identify the MMPI as an appropriate screening tool for eating disorders through detection of a significant V-shaped pattern on scales 4-5-6. Identifying an eating-disorder pattern on the MMPI could assist the clinician to use more specific instruments targeting eating disorders to rule out or confirm diagnosis. This is particularly significant in dealing with shame and guilt-ridden bulimic individuals who may be reluctant to seek out treatment (Brownwell & Fairburn, 1995).

Eating-Disorder Pattern on the MMPI

With the exception of Pendleton's research, most studies on the MMPI and eating disorders have focused on

high point elevations rather than a specific configuration (Casper et al., 1992; Dykens & Gerrard, 1986; Norman & Herzog, 1983; Shisslak et al., 1990). The 4-5-6 configuration is evident when scales 4 and 6 are above a T-score of 65 and scale 5 is below a T-score of 35 (Greene, 1980). Greene also noted that scales 4 and 6 need not be the high points on the profile for the configuration to exist. Greene (1980) described women with the 4-5-6 configuration as angry, hostile, and unable to directly express these feelings. Webb, McNamara, and Rodgers (1981) noted that a low T-score of 40 on scale 5 found in women with the code of 46/64 often appears to be associated with a passive-aggressive personality. Newark (1979) has described women with this configuration to be angry and unable to express these feelings directly, leading to a high degree of passive-aggressiveness.

Indirect expression of anger is a characteristic associated with the development of eating disorders. Johnson and Connors (1987) noted that most bulimic women avoid directly expressing angry feelings due to fear of interpersonal disapproval or rejection. Striegel-Moore, Silberstein, and Rodin (1986) have described bulimic women as unassertive and eager to please. Root et al., (1986) have also described bulimic women's problems with anger and that recovery entails appropriate expression of these feelings.

Summary

The victim's denial, shame, guilt, or fear may prevent her from seeking treatment to deal with her eating disorder. Sometimes, financial barriers may also prevent victims from seeking needed treatment (Brownwell & Fairburn, 1995). Many authors stress the significance of early detection for successful intervention and treatment (Morgan & Russell, 1975; Pierloot et al., 1975; Slade & Dewey, 1986).

Existing eating-disorder instruments such as the EAT, EDI, BULIT, and Binge Eating and Cognitive Factors scales have been devised to help accurately assess eating disorders. These instruments, however, are symptom specific to eating disorders and are transparent. Additionally, these instruments are designed to assess rather than screen for eating disorders.

A screening tool is still needed to prevent the entrenchment of eating disorders. The MMPI may be a more appropriate tool to screen for eating disorders since it also is well recognized as a measure of general psychopathology. The MMPI's ability to measure general psychopathology is significant since it can address the issue of comorbidity. The MMPI can also identify how other eating-disorder assessment instruments may or may not prove useful.

However, past work in uncovering an eating-disorder pattern on the MMPI has produced equivocal results when

attempting to identify significant patterns (Dykens & Gerrard, 1986; Rybicki et al., 1989; Williamson, 1990). These equivocal findings may be the result of comorbidity. By addressing the issue of comorbidity in this research, it is my hope that this study will add to the existing body of knowledge of eating disorders by identifying a significant eating-disorder pattern on the MMPI.

The MMPI has long been recognized as a primary screening instrument for overall psychopathology (Williamson, 1990). Because of its utility as a general screening device, the impact of comorbidity can also be addressed in this research. Further examining the 4-5-6 configuration on the MMPI as well as scales 2 and 7 in an eating-disorder population is warranted to possibly identify the existence of a eating-disorder pattern. Identifying a significant configuration that would screen for eating disorders on the MMPI may allow for early intervention and successful treatment.

CHAPTER III

METHODOLOGY

Introduction

The purpose of this ex post-facto research is to identify an eating-disorder pattern on the MMPI profile. This chapter discusses the research sample, variables, instrumentation, procedures, null hypotheses, and methods of analysis.

Sample

The sample consisted of 356 adult females who sought treatment through the Healthy Options for Problem Eaters (HOPE) Program of Memorial Hospital in South Bend, Indiana, from 1989 to 1996. Male subjects were excluded from this study since they represented a small number of the profiles. Two hundred and fifty of the subjects met the diagnostic criteria for bulimia and 106 subjects met the diagnostic criteria for anorexia nervosa. These subjects completed the MMPI as part of a psychological assessment performed by the consulting psychologist.

Diagnostic criteria were from the DSM-III-R and DSM-IV (see Appendices A & B). The DSM-IV incorporated changes that were designed to be more consistent with clinical

practice (Wilson & Walsh, 1991). It is my opinion that, although these criteria are more specific, it is very unlikely that it would place individuals into different diagnostic groups, but rather increase the number of individuals accurately diagnosed as bulimic or anorectic.

Variables

The grouping variables of this study are the particular type of eating disorder suffered by the client. The two types of eating disorders that were the focus of this research are anorexia nervosa and bulimia nervosa. The dependent variables are the clinical scales on the MMPI: Hypochondriasis (1-Hs), Depression (2-D), Hysteria (3-Hy), Psychopathic Deviate (4-Pd), Masculinity-Femininity (5-Mf), Paranoia (6-Pa), Psychasthenia (7-Pt), Schizophrenia (8-Sc), Hypomania (9-Ma), and Social Introversion (0-Si) (Greene, 1980). Particular study was made of scales 4, 5, and 6 as a group and scale 2 and scale 7 separately.

Instrumentation

The MMPI is a widely used and researched objective personality inventory (Greene, 1980). Dahlstrom, Welsh, and Dahlstrom (1975) include almost 6,000 references on the clinical and research applications of the MMPI in An MMPI Handbook. Originally devised by Hathaway and McKinley in 1940, the MMPI provides an objective means of assessing abnormal behavior. The subjects in this research took the booklet form of the MMPI and responded to 566 statements as

either "true " or "false". The person's responses to these statements are then scored on 10 clinical scales that assess major categories of abnormal behavior. In addition, four validity scales assess the person's test-taking attitudes. These are the Cannot Say (?), Lie (L), F (F), and K (K) scales. The clinical scales' numbers and abbreviations include: Hypochondriasis (1-Hs), Depression (2-D), Hysteria (3-Hy), Psychopathic Deviate (4-Pd), Masculinity-Femininity (5-Mf), Paranoia (6-Pa), Psychasthenia (7-Pt), Schizophrenia (8-Sc), Hypomania (9-Ma), and Social Introversion (0-Si) (Greene, 1980).

In 1989 the MMPI was revised significantly and renamed the MMPI-2. The revised MMPI (MMPI-2) includes 567 items. MMPI-2 is similar in many ways to the original MMPI. The MMPI-2 booklet includes the items necessary for scoring the standard validity and clinical scales. Much of the research concerning interpretation of the original MMPI still applies directly to the MMPI-2 (Weed & Butcher, 1992). Improvements of the original MMPI include a more representative sample, improved and updated items, some new scales, and deletion of objectionable items (Graham, 1990).

Development and Rationale of MMPI/MMPI-2

Hathaway and McKinley used the empirical keying approach in the construction of the various MMPI scales. Test items were treated as unknowns, and empirical item analysis was utilized to identify test items that

differentiated between criterion groups (Graham, 1990).

In the first step, Hathaway and McKinley selected a pool of 504 from 1000 personality-type statements that they judged to be reasonably independent of each other. Next, they selected appropriate criterion groups. One group consisted of relatives and visitors of patients in the University of Minnesota Hospital and recent high-school graduates attending precollege conferences at the University of Minnesota. This criterion group was referred to as the Minnesota normals.

The second criterion group consisted of clinical subjects that made up the psychiatric patients at the University of Minnesota Hospitals. Patients in this group represented all the major psychiatric categories being utilized clinically at the time of the test construction. The different subgroups of clinical subjects formed were hypochondriasis, depression, hysteria, psychopathic deviation, paranoia, psychasthenia, schizophrenia, and hypomania (Graham, 1990).

The original 504 test items were administered to the Minnesota normal criterion group and to the patients in each of the clinical groups. Item analysis was also conducted for each of the clinical groups to identify those items in the pool of 504 that differentiated significantly among the specific clinical group, other clinical groups, and a group of normal subjects. Individual MMPI items identified by this procedure were then included in the resulting MMPI

scale for the clinical group (Graham, 1990).

The scale was administered to new groups of normal subjects, clinical subjects with that particular diagnosis, and clinical subjects with other diagnoses in an attempt to cross-validate each clinical scale. The clinical scale was adequately cross-validated when significantly different scores were found to exist between the normal group, the specific clinical group, and the group of other clinical subjects (Graham, 1990).

The validity scales were developed to detect deviant test-taking attitudes. The Cannot Say scale consists of the total number of items in the MMPI either omitted or responded to as true/false. The likelihood of an invalid profile increases when the score on this scale exceeds 60 (Groth-Marnet, 1984). The Lie scale of the MMPI was designed to detect attempts of the test subject to present himself/herself in a favorable light and to assess the strength of the person's unwillingness to admit even to very minor weaknesses in character (Graham, 1990).

The F scale of the MMPI was designed to detect deviant response sets and identify individuals who failed to comply with the test instructions when completing the MMPI. The K scale of the MMPI was designed to identify clinical defensiveness. A high K score calls into question the person's responses to all the other items. The K scale also was later utilized to develop a correction factor for some of the clinical scales (Graham, 1990).

The MMPI was revised to the MMPI-2 in 1989. The MMPI-2 is similar to the MMPI. Some objectional items were deleted (Graham, 1990). Development of the MMPI-2 involved updated and improved items, a representative sample, and deletion of objectional items (Graham, 1990). Despite these changes, a T-score of 65 on the MMPI has approximately the same clinical meaning as a T-score of 65 on the MMPI-2 since the two norm groups are similar in terms of raw score means and standard deviations.

A brief description of the implications of high and low scores on the clinical scales follows:

Scale 1 (Hypochondriasis) attempts to assess the degree to which individuals have undue concern with physical health. Elevations typically reflect exaggerated expressions of nonspecific disorders in which individuals are covertly seeking to control and manipulate others. They frequently will present as pessimistic and passive-aggressive. They tend to focus their psychological and emotional complaints into physical channels. Therapy with these individuals is difficult, due to poor or little insight into their problems. Higher elevations are restricted to hypochondriacal traits while lower scales describe individuals who use good judgment and are generally alert, capable, and responsive (Graham, 1987; Greene, 1980).

Scale 2 (Depression) measures the individual's expression of worry, discouragement, and low self-esteem. The questions are centered around the five major features of

depression which include brooding, physical slowness, subjective feelings of depression, mental apathy, and physical malfunctioning. Low scores on scale 2 may describe active, alert, and outgoing individuals whereas higher scores may be suggestive of depression. Scale 2 provides the best single index of the current level of satisfaction, security, and comfort (Graham, 1987; Greene, 1980).

Scale 3 (Hysteria) assesses the presence of specific physical complaints and defensive denial of emotional or interpersonal difficulties. Such individuals adjust to difficulties by maintaining an exaggerated degree of optimism and channeling any personal conflicts into the body where these conflicts are indirectly expressed through physical complaints. Lower scores on scale 3 usually suggest a constricted, controlled, and conventional individual whereas higher scores may describe a conforming, immature, naive, and impulsive individual (Graham, 1987; Greene, 1980).

Scale 4 (Psychopathic Deviate) is designed to measure general social maladjustment. The questions deal with the individual's degree of alienation from his family, the extension of difficulties to school and to authority figures in general, social imperviousness, and alienation from both self and society. This scale measures the degree of impulse control and may be indicative of acting-out behaviors. Elevations on this scale may describe individuals who are angry, rebellious, impulsive, alienated, and strongly

disliking rules and regulations. Lower scores may describe individuals who are conventional, cheerful, good tempered, and persistent in working toward their goals. Many times these individuals present as "charming" but periods of stress eventually reveal their true nature of moodiness and unreliability (Graham, 1987; Greene, 1980).

Scale 5 (Masculinity-Femininity) deals with personal and emotional stability, sexual identification, altruism, feminine occupational identification, and denial of masculine occupations. Elevations for either males or females can generally be seen as indicating a nonidentification with traditional masculine or traditional feminine roles. It is correlated with both education and intelligence. Elevations on scale 5 have different meanings for the different sexes (Graham, 1987; Greene, 1980).

Elevations for males on scale 5 reflect imagination, sensitivity, a wide range of cultural interests, and a devotion to work within the normal male population. Moderately high scores are frequently seen as inner-directed, clever, curious, and having good judgment and common sense. Males who score low are seen as adventurous and easygoing and usually typify traditional masculine interests (Graham, 1987; Greene, 1980).

Elevations on scale 5 for females are usually found in those who serve in traditional male roles and occupations such as mechanics or science. These females are perceived as being confident, competitive, aggressive, dominating, and

adventurous. Females who score low are often described as placing a high value on traditional female interests, and are usually sensitive and modest. However, since education and intelligence correlate with this scale, extreme caution needs to be used in interpreting low scores for females of higher intellect and educational levels (Graham, 1987; Greene, 1988).

Scale 6 (Paranoia) includes 40 items that attempt to assess an individual's degree of interpersonal sensitivity, suspiciousness, and self-righteousness. Elevations on this scale may be indicative of an overt psychotic delusional system and a more coherent paranoid personality disorder. It may indicate a paranoid person who is brooding and suspicious, ruminating on grudges, and who feels that life has been unfair. Such individuals frequently experience delusions of reference, feelings of persecution, and the likelihood of obsessions, compulsions, and phobias. Differences exist in interpretation of a low score on scale 6 for males and females (Graham, 1987; Greene, 1980).

Males who score low on scale 6 are perceived as being balanced, cheerful, decisive, self-centered, lacking a strong sense of conscience, and possessing a narrow range of interests. Females are frequently described as reasonable and mature. It is important to differentiate between low scores of paranoid persons attempting to hide their suspiciousness and those of normal individuals. In covert cases of paranoid individuals attempting to present

normally, personality characteristics are similar to elevations of scale 6 which consist of touchiness, moodiness, cautiousness, and extreme sensitivity in personal relationships (Graham, 1987; Greene, 1980).

Scale 7 (Psychasthenia) measures the extent of symptoms related to anxiety, irrational fears, self-devaluation, and excessive doubt. It is the MMPI's best indicator of anxiety and ruminative self-doubt. Elevations on this scale may reveal perfectionistic, conscientious, orderly, self-critical, worrisome individuals. Additionally, these individuals may experience anxiety that interferes with daily activities, disabling feelings of guilt, fixed obsessions, compulsions, or phobias in addition to being extremely fearful and agitated. Low scores on this scale may describe individuals who are alert, self-confident, and relaxed (Graham, 1987; Greene, 1980).

Scale 8 (Schizophrenia) attempts to assess such factors as unusual thought processes, apathy, feelings of social alienation, poor family relations, and peculiarities of perception. Elevations on scale 8 may identify unusual, unconventional, eccentric individuals. Low scores may be indicative of controlled, restrained, adaptable individuals who may be overly accepting and practically oriented (Graham, 1987; Greene, 1984).

Scale 9 (Hypomania) assesses the individual's energy level, expansiveness, egotism, and irritability. Originally, the scale was developed to assess hypomania and

mild acute mania. The scale may also reflect the level of energy at the time of testing and is therefore somewhat subject to fluctuations depending on the mood (Graham, 1987; Greene, 1980).

Males who score high on scale 9 may exhibit warmth, enthusiasm, and extraversion. They are frequently generous, affectionate, adventurous, expressive, and individualistic. Females who score high on this scale tend to be talkative, enthusiastic, flexible, courageous, and frank. Low scores on scale 9 suggest a low level of energy, apathy, and low self-confidence. However, low scores appear more common in older people. Thus, a low score carries a greater significance for younger people (Graham, 1987; Greene, 1980).

Scale 0 (Social Introversion) is a measure of the extent to which individuals participate in social events and their degree of comfort in interpersonal relations. Elevations on this scale may be indicative of experiencing discomfort in social situations, feelings of inferiority, and lack of self-confidence. These individuals may be perceived as shy, introverted, and anxious while around people. Individuals with low scores are often described as sociable, outgoing, warm, and involved in groups. Extremely low scores may suggest a lack of close and meaningful relationships (Graham, 1987; Greene, 1980).

Procedures

The MMPI profiles used were collected by the consulting psychologist of the HOPE Program of Memorial Hospital. Access to these files was obtained through the hospital's human subject review board (see Appendix C). The T-scores of the clinical scales were studied to identify the possible existence of an eating-disorder pattern. The data analyzed from the MMPI profiles were collected between 1989 and 1996.

Limitations

When researching the personality traits of individuals with an eating disorder it may be difficult to differentiate between truly stable personality features and characteristics that result from having the eating disorder. The effects of starvation experienced by many anorectic or bulimic individuals may have significant implications when researching eating disorders (Lilenfeld, 1995).

A comprehensive study of the effects of semistarvation on healthy adult males yielded important information about the effects of starvation on the psychological states of these individuals. Symptoms of social withdrawal, irritability, obsessiveness, rigidity, anxiety, and depression were noted among previously well-adjusted individuals within weeks of restricted food intake (Keys, Brozek, Henschel, Mickelsen, & Taylor, 1950).

From this research it appears that the anorectic

individuals and the healthy adult males who experienced semistarvation share similar symptoms. The effects of starvation on bulimia nervosa are also relevant, since bulimic women may also experience a state of semistarvation when they fail to maintain their genetically predetermined weight. Even though bulimic women do not display the gaunt appearance of anorectic women, they may also be suffering from semistarvation (Lilenfeld, 1995). Thus, researchers studying eating-disordered subjects must keep in mind the potential impact of starvation on the assessment of personality.

Another limitation in researching eating disorders is the issue of comorbidity. Depressive disorders appear to be found in about half the people with eating disorders. Anxiety disorders such as social phobia and fears of being fat are also common among eating-disordered patients. Obsessive-compulsive features surrounding food are also seen in anorectic patients. Although these disorders may develop secondarily to the eating disorders, they may also have been a predisposing factor. Thus, it is important to address the role of comorbidity when undertaking research with the MMPI and eating disorders (Cooper, 1995).

Methods of Analysis and Null Hypotheses

Data Analysis

Lilenfeld (1995) suggests that there are several ways to evaluate differences among groups when interpreting MMPI

data. Evaluation methods include comparing mean scale scores, code types, and the overall profile configuration between two groups. Depending on only one of these methods of interpretation may result in lost or partially lost information. Thus, several evaluation methods need to be employed in order to obtain accurate results.

In this research, the data were analyzed as follows:

1. Profile analysis was undertaken to compare the profiles of the anorectic and bulimic subsamples to each other and to the population profile.
2. The means of each of the two separate groups were compared to the norms on each of the separate clinical scales.
3. The means of these two separate groups were compared to one another on each of the separate scales.
4. Discriminant analysis was used to seek a linear combination of the scales to best separate the two groups from each other.
5. Chi-square analysis was used to address the problems of extreme scores in the sample.
6. The proportion of each subsample scoring high or low on individual scales of interest (i.e., scales 2, 4, 5, 6, & 7) were studied.
7. The presence of the V profile on scales 4, 5, and 6 was studied.

The original authors of the MMPI chose T-scores of 70

and 30 as the cutoff for clinical significance. Since this represents 2 or more standard deviations above the mean, only the top 2.5% of the population are considered as manifesting psychopathological levels of the characteristics measured on each scale. In determining the upper and lower cutoffs defining clinical significance for the analysis, the 4-5-6 V profile, the T-scores of 65 and 35 were selected. The slightly lower cutoffs used in this study were selected for several reasons. First, personality characteristics are manifested along a continuum. The cutoff that is selected for determining clinical significance somewhat arbitrarily dichotomizes the population into two groups. It can be argued that for the purposes of creating a screening tool, a more liberal cutoff is more appropriate. Second, by setting the clinical significance at T-scores of 65 and 35, this study was consistent with Greene's (1980) 4-5-6 profile which defines the upper cutoff for clinical significance at a T-score of 65. Finally the authors responsible for the revisions of the MMPI into the MMPI-2, chose to lower the T-score cutoff for clinical significance .5 standard deviations units to 65.

Null Hypotheses

The following null hypotheses were tested.

Null Hypothesis 1: The profiles of the anorectic and bulimic subsamples are not significantly different from each other.

Null Hypothesis 2: The profile of the anorectic subsample is not significantly different from that of the normal population.

Null Hypothesis 3: The profile of the bulimic subsample is not significantly different from that of the normal population.

Hypotheses 1 to 3 were tested by profile analysis.

Null Hypothesis 4: The mean score of the anorectic subsample does not differ significantly from the population mean of 50 on each of the scales.

This hypothesis was tested by the z-test of the departure of a sample mean from a hypothesized population mean.

Null Hypothesis 4a: For the complete subsample of anorectics, the median score is 50 on each scale.

This hypothesis was tested by chi-square analysis.

Null Hypothesis 5: The mean score of the bulimic subsample does not differ significantly from the population mean of 50 on each of the scales.

This hypothesis was tested in the same way as Hypothesis 4.

Null Hypothesis 5a: For the complete subsample of bulimics, the median score is 50 on each scale.

This hypothesis was tested by chi-square analysis.

Null Hypothesis 6: The means of the anorectic and bulimic subsamples will not significantly differ from each other on any clinical scale of the MMPI.

This hypothesis was tested by the t -test for the means of two independent samples, and separately for each of the 10 clinical scales.

Null Hypothesis 6a: There is no significant difference between the medians of the anorectic and bulimic subsamples on any of the 10 scales.

Chi-square analysis was used to test this hypothesis.

Null Hypothesis 7: There is no linear combination of the 10 clinical scales that significantly discriminates between the centroids of the bulimic and anorectic subsamples.

Null Hypothesis 7 was tested by discriminant analysis.

I studied the V-shaped profile for clinical scales 4, 5, and 6 at several levels. For Level 1, scores on subscales 4 and 6 are both greater than on scale 5. For Level 2, scores on clinical scales 4 and 6 are both greater than 50, and on scale 5 less than 50. For Level 3, scores on subscales 4 and 6 are both greater than or equal to 65, and on subscale 4 less than 50. For Level 4, scores on subscales 4 and 6 are both greater than or equal to 65 and on subscale 5 less than or equal to 35. At each level, two further null hypotheses were tested:

Null Hypothesis 8: The proportion of the anorectic subsample manifesting the V-shaped profile is not significantly different from what would be expected by chance.

Null Hypothesis 9: The proportion of the bulimic

subsample manifesting the V-shaped profile is not significantly different from what would be expected by chance.

Null Hypotheses 8 and 9 were tested by the z -test of the departure of a sample proportion from a hypothesized population proportion.

All hypotheses were tested at the .05 level of significance.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

This chapter presents data on the sample and instrument, and concludes with a report of the results of testing the null hypotheses.

Sample

This research sample was obtained from the records of the HOPE Program of Memorial Hospital in South Bend, Indiana. The consulting psychologist assessed the program participants through a clinical interview, MMPI, and MCMI. There were 356 profiles analyzed for this research. All participants were females who participated in the HOPE Program from 1987 to 1995. Of the 356 subjects in the sample, 106 were anorectic and 250 were bulimic. Table 2 provides information about the age of the subjects.

Basic Data for Analysis

All data description and analysis are undertaken using the standardized T-scores (M = 50, SD = 10).

Table 3 gives details for each scale of various measures of central value and variability. As indicated in Table 3, the highest mean of 75.11 occurred on the

TABLE 2
AGE OF SUBJECTS
(Percentages in Parentheses)

Age Level	Anorectics	Bulimics	Total
1 (below 18)	14 (13.2)	39 (15.6)	53 (14.9)
2 (18-25)	58 (54.7)	105 (42.0)	163 (45.8)
3 (26-35)	20 (18.9)	67 (26.8)	87 (24.4)
4 (36+)	14 (13.2)	39 (15.6)	53 (14.9)

TABLE 3
BASIC DATA ON SCALES

Scale	<u>M</u>	Median	Mode	<u>SD</u>	Range
Hypochondriasis	66.47	64.50	62	13.25	33-101
Depression	75.11	75.29	71	13.24	38-107
Hysteria	68.85	68.50	73	10.95	43-96
Psychopathic Deviate	73.75	73.88	*63 74	12.81	28-108
Masculinity- Femininity	45.17	44.97	47	9.48	22-97
Paranoia	67.22	66.25	65	12.22	35-110
Psychasthenia	69.86	69.33	78	12.36	37-102
Schizophrenia	69.16	66.38	60	15.54	35-118
Hypomania	59.66	59.05	59	11.78	22-113
Social Introversion	61.05	61.17	67	11.06	27-88

*bimodal.

occurred on the Masculinity-Femininity scale (5). The overall scores on 9 of the 10 scales were high, and the frequency distributions indicated that most were positively skewed. Six of 10 were positively skewed, and the other four were slightly negatively skewed. These results were not surprising, given this sample came from a clinical population.

Table 4 shows, for each separate scale, the frequency (and proportion) of subjects with a T-score greater than or equal to 65 or less than or equal to 35, separately.

Of interest is the 52 scores below 35 on scale 5. Graham (1987) noted that a high T-score for female subjects is indicative of deviation from one's own sex. Therefore, most women would be expected to score in the normal to low range on the MMPI scale 5.

Additionally, this sample was derived from an eating-disorders population. Several authors (Brownwell & Fairburn, 1995; McFarland, 1995) have noted that cultural influences such as the media may be a precipitating factor to developing an eating disorder. It is expected, therefore, that individuals who suffer from eating disorders may in fact be more influenced by societal stereotypes of beauty than other women. These influences may be demonstrated in adhering to cultural stereotypes of women and reflected in a normal to low MMPI scale 5 score.

As supported by the literature review, elevations on many of the scales were expected. This sample supported

TABLE 4
FREQUENCY OF CLINICAL LEVELS

Scale	Anorectics $\underline{n}=106$		Bulimics $\underline{n}=250$		Total $\underline{n}=356$	
	≥ 65	≤ 35	≥ 65	≤ 35	≥ 65	≤ 35
1	57(.538)	0(0)	121(.484)	1(.004)	178(.500)	1(.003)
2	86(.811)	0(0)	199(.796)	0(0)	285(.801)	0(0)
3	71(.670)	0(0)	152(.608)	0(0)	223(.626)	0(0)
4	74(.698)	0(0)	191(.764)	1(.004)	265(.744)	1(.003)
5	0(0)	18(.170)	7(.028)	34(.136)	7(.020)	52(.146)
6	59(.557)	0(0)	155(.620)	1(.004)	214(.601)	1(.003)
7	69(.651)	0(0)	167(.668)	0(0)	236(.663)	0(0)
8	54(.509)	0(0)	141(.564)	1(.004)	195(.548)	1(.003)
9	33(.311)	1(.009)	79(.316)	2(.008)	112(.315)	3(.008)
10	47(.443)	0(0)	97(.388)	4(.016)	144(.404)	4(.011)

previous findings in that scales 2, 3, 4, 6, 7, and 8 had over 50% of the subjects at a clinically significant level.

Eighty percent of the subjects responded at a clinically significant level on scale 2 (Depression). Sixty-two percent of the subjects responded at a clinically significant level on scale 3 (Hysteria). Seventy-four percent of the subjects responded at a clinically significant level on scale 4 (Psychopathic Deviate). Sixty percent of the subjects responded at a clinically significant level on scale 6 (Paranoia). On scale 7, (Psychasthenia) 66% of the subjects responded at a clinically significant level. Fifty-four percent of the subjects responded at a clinically significant level on scale 8 (Schizophrenia).

Analysis for Hypothesis Testing

This analysis is presented in three sections: (1) profile analysis, (2) hypothesis tests involving the means, and (3) study of the V-shaped profile.

Profile Analysis

Figure 1 displays the profiles of the anorectic and bulimic subsamples. These profiles are shown with reference to the population mean (50) and the clinical boundaries (high of 70; low of 30). The graph clearly indicates that the two subsample profiles are approximately parallel, at the same level, and very different from the horizontal profile of the population.

Profile analysis by means of SPSS MANOVA program (Tabachnick & Fidell, 1996, pp. 451-453; 498-502) was used to test three null hypotheses.

Hypothesis 1: The profiles of the anorectic and bulimic subsamples are not significantly different from each other.

Hypothesis 2: The profile of the anorectic subsample is not significantly different from that of the normal population.

Hypothesis 3: The profile of the bulimic subsample is not significantly different from that of the normal population.

The program uses Box's M statistic, leading to an approximate F statistic, to test the important assumption

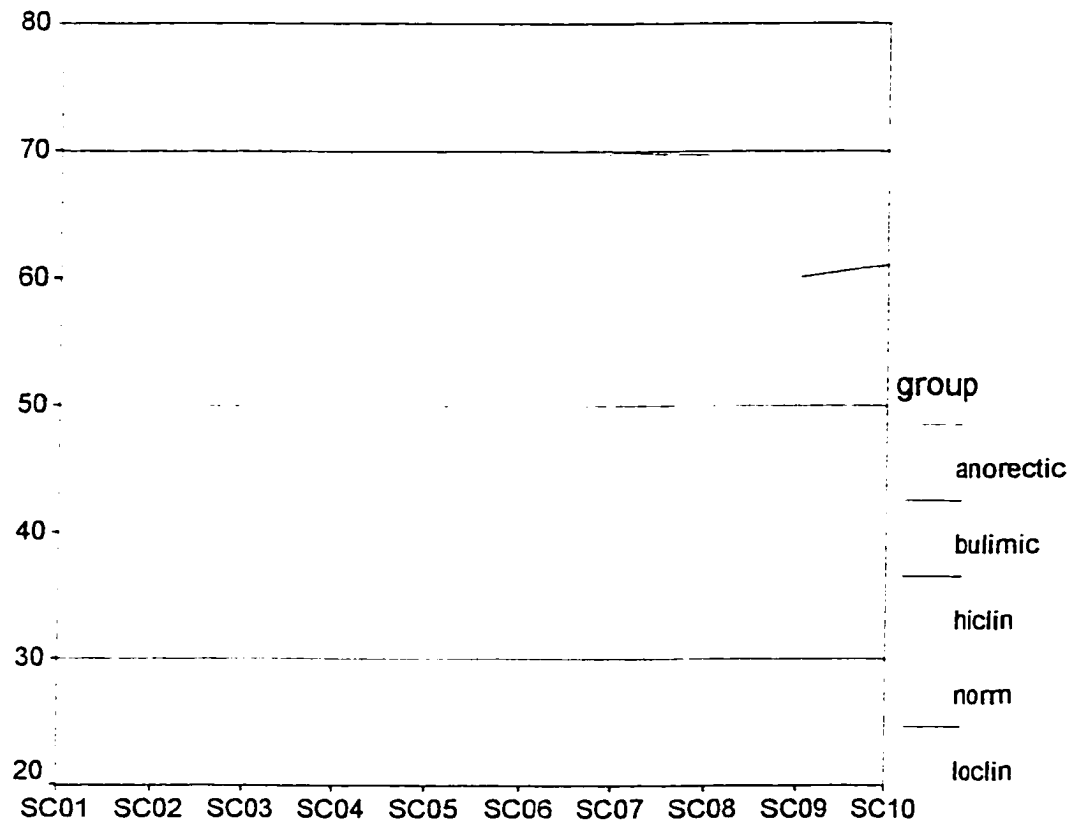


Figure 1. Profile of means.

of homogeneity of dispersion matrices. This yielded $F = 1.037$, and $p = .400$. The fact that this very sensitive test (Tabachnick & Fidell, 1996, p. 413) yielded a non-significant result gives confidence in the robustness of the following significance tests.

The parallelism test yielded Hotelling's $T^2 = .03347$, with an approximate F of 1.287 and $p = .243$.

The levels test yielded $F = 0.04$ and $p = .839$.

Thus, Hypothesis 1 is retained. The two subsample profiles are parallel and on the same level.

As these two profiles are parallel, the flatness test is appropriate. This test looks at the overall profile of the two groups combined. Clearly this profile lies between the other two in Figure 1, and does not warrant a separate graphing. The flatness test yields Hotelling's $T^2 = 4.21582$, leading to an approximate F of 162.075 and p less than .0005. Thus, the profiles depart significantly from the flat profile of the normal population. This leads to the rejection of Hypotheses 2 and 3.

Means

The rejection of Hypotheses 2 and 3 leads to the study of how each subscale mean departs from the mean of the normal population (50 on each subscale), and whether the means of the two subsamples differ from one another on any subscale.

Hypothesis 4: The mean score of the anorectic

subsample does not differ significantly from the population mean of 50 on each of the scales.

Hypothesis 5: The mean score of the bulimic subsample does not differ significantly from the population mean of 50 on each of the scales.

Hypotheses 4 and 5 were tested by the z -test for a single sample mean, using the known population standard deviation of 10. Thus, for the anorectic subsample, the standard error of the mean is $10/\sqrt{106} = 0.971$; and, for the bulimic subsample, $10/\sqrt{250} = 0.632$. Table 5 provides the deviation of the mean from 50 and the z -score for each of the clinical scales in the anorectic and bulimic subsamples. With $\alpha = .05$, the critical value of z is ± 1.96 . Thus, the values of z in Table 5 are clearly all highly significant. Both Hypotheses 4 and 5 are rejected. Thus the mean scores for the anorectic and the bulimic subsamples differ significantly from the population mean of 50 on each of the scales.

The use of z -tests of significance for Hypotheses 4 and 5 could be questioned because of the extreme scores, which greatly influence the mean.

I therefore decided to use, in addition, a test of the significance of the difference of the median from 50. This leads to Hypotheses 4a and 5a.

Hypothesis 4a: For the complete subsample of anorectics, the median score is 50 on each scale.

Hypothesis 5a: For the complete subsample of

TABLE 5

Z-TEST OF HYPOTHESES 4 AND 5

Scale	Anorectic (<u>n</u> =106)		Bulimics (<u>n</u> =250)	
	<u>x</u> -50	<u>z</u>	<u>x</u> -50	<u>z</u>
Hypochondrias	18.094	18.65*	15.784	25.05*
Depression	26.368	27.18*	24.572	39.00*
Hysteria	19.623	20.23*	18.520	29.40*
Psychopathic Deviate	22.660	23.36*	24.212	38.43*
Masculinity- Femininity	-5.594	-5.77*	-4.504	-7.15*
Paranoia	16.453	16.96*	17.544	27.85*
Psychasthenia	19.793	20.40*	19.892	31.57*
Schizophrenia	17.859	18.41*	19.708	31.28*
Hypomania	8.660	8.93*	10.080	16.00*
Social Introversion	11.047	11.39*	11.056	17.55*

*significant.

bulimics, the median score is 50 on each scale.

These hypotheses were tested by chi-square analysis.

Chi-square analysis addressed the concerns surrounding the many extreme scores, and their possible influence on the mean, by analyzing the frequency of scores above and below 50. The frequency of scores of 50 was equally divided between the two groups (above and below).

Tables 6 and 7 show, for each variable, the number of cases scoring above and below 50, and the value of chi-square, using an expected frequency of 53 for the anorectic and 125 for the bulimic subsamples. With 1 df, the critical value of chi-square is 3.841. Clearly, each of

TABLE 6
CHI-SQUARE ANALYSIS--ANORECTIC

Scale	Median	<u>fo</u>	<u>fe</u>	Chi-Square
Hyponchondrias	below 50	9.0	53	73.06*
	above 50	97.0	53	
Depression	below 50	2.0	53	98.15*
	above 50	104.0	53	
Hysteria	below 50	6.0	53	83.36*
	above 50	100.0	53	
Psychopathic Deviate	below 50	6.0	53	83.36*
	above 50	100.0	53	
Masculinity-Femininity	below 50	77.0	53	21.74*
	above 50	29.0	53	
Paranoia	below 50	8.5	53	74.73*
	above 50	97.5	53	
Psychasthenia	below 50	6.5	53	81.59*
	above 50	99.5	53	
Schizophrenia	below 50	9.5	53	71.41*
	above 50	96.5	53	
Hypomania	below 50	26.5	53	26.50*
	above 50	79.5	53	
Social Introversion	below 50	25.5	53	28.40*
	above 50	80.5	53	

Note. Critical chi-square = 3.841.

TABLE 7

CHI SQUARE ANALYSIS--BULIMICS

Scale	Median	<u>fo</u>	<u>fe</u>	Chi-Square
Hyponchondrias	below 50	26.5	125	155.24*
	above 50	223.5	125	
Depression	below 50	8.5	125	217.16*
	above 50	241.5	125	
Hysteria	below 50	9.5	125	213.44*
	above 50	240.5	125	
Psychopathic Deviate	below 50	9.5	125	213.44*
	above 50	240.5	125	
Masculinity-Femininity	below 50	183.5	125	54.76*
	above 50	66.5	125	
Paranoia	below 50	14.0	125	197.14*
	above 50	236.0	125	
Psychasthenia	below 50	14.5	125	195.36*
	above 50	235.5	125	
Schizophrenia	below 50	20.0	125	176.40*
	above 50	230.0	125	
Hypomania	below 50	47.0	125	97.34*
	above 50	203.0	125	
Social Introversion	below 50	44.0	125	104.98*
	above 50	206.0	125	

Note. Critical chi-square = 3.841.

the 20 chi-square values in the two tables is highly significant. Null hypotheses 4a and 5a are rejected. For both anorectic and bulimic subsamples, the median score on each variable is significantly less than 50 on the Masculine-Femininity scale, and significantly above 50 on the other nine scales.

Hypothesis 6: The means of the anorectic and bulimic subsamples will not significantly differ from each other on any clinical scale of the MMPI.

This hypothesis was tested by the t -test for the means of two independent samples, separately for each of the 10 clinical scales.

Since, in all cases, the Levene F for variability is nonsignificant, the pooled t values were used to determine significance. Table 8 provides the pooled t and p -values for all the clinical scales in the bulimic and anorectic subsamples.

As shown in Table 8, the p value exceeds .05, rendering nonsignificant findings for each of the scales. Thus, the null hypothesis stating that the means of the anorectic and bulimic subgroups will not significantly differ from each other on any clinical scale of the MMPI is retained.

To parallel hypotheses 4a and 5a, I decided to compare the medians of the anorectic and bulimic subsamples by chi-square analysis. Thus, an additional null hypothesis was tested.

TABLE 8
 χ^2 -TESTS FOR HYPOTHESIS 6

Scale	χ^2	p
Hyponchondrias	1.51	.1326
Depression	1.17	.2424
Hysteria	0.87	.3855
Psychopathic Deviate	-1.05	.2966
Masculinity-Femininity	-0.99	.3216
Paranoia	-0.77	.4417
Psychasthenia	-0.07	.9447
Schizophrenia	-1.03	.3051
Hypomania	-1.04	.2993
Social Introversion	-0.01	.9949

Hypothesis 6a: There is no significant difference between the medians of the anorectic and bulimic subsamples on any of the 10 scales.

For each scale, the chi-square test has 1 degree of freedom, with critical value 3.841.

Table 9 gives the results of the analysis for each of the 10 scales. As there were 106 and 250 subjects, respectively, in the two subsamples, it was necessary that each contingency table have the column frequencies sum to 106 and 250, respectively, and each row sum to 178. In order to accomplish this, it was necessary to calculate the median of the overall group to one or sometimes two decimal places. This value was then used to determine how many in each subsample scored above and below the overall median.

TABLE 9

CHI-SQUARE ANALYSIS--HYPOTHESIS 6A

Scale	Overall Median	<u>Contingency Table</u>		Chi-Square
		Anorectic	Bulimic	
Hypochondrias	64.50	above median	57 121	0.86
		below median	49 129	
Depression	75.29	above median	53 125	0
		below median	53 125	
Hysteria	68.50	above median	58 120	1.34
		below median	48 130	
Psychopathic Deviate	73.88	above median	49 129	0.86
		below median	57 121	
Masculinity-Femininity	44.97	above median	50 128	0.48
		below median	56 122	
Paranoia	66.25	above median	50 128	0.48
		below median	56 122	
Psychasthenia	69.33	above median	51 127	0.21
		below median	55 123	
Schizophrenia	66.38	above median	51 127	0.21
		below median	55 123	
Hypomania	59.05	above median	50 128	0.48
		below median	56 122	
Social Introversion	61.17	above median	53 125	0
		below median	53 125	

All chi-square values are very low, well below the critical value of 3.841 with 1 df. Therefore, for each scale, the null hypothesis is retained. There is no significant difference between the medians of the anorectic and bulimic subsamples.

Hypothesis 7: There is no linear combination of the 10 clinical scales that significantly discriminates between the centroids of the bulimic and anorectic subsamples.

Null Hypothesis 7 was tested by discriminant analysis. The one discriminant function yielded chi-square = 11.492 with df = 10 and p = .3205. Thus, the null hypothesis stating that there is no linear combination of the 10 clinical scales which significantly discriminates between the bulimic and anorectic subsample is retained.

The V-Shaped Profile

Of particular significance in this research was the existence of a V-shaped pattern on scales 4, 5, and 6 as a possible means to screen for the existence of eating disorders. It was my hope that the identification of such a pattern could prompt the clinician to further assess for the existence of a possible eating disorder.

I studied the V-shaped profile for clinical scales 4, 5, and 6 at several levels:

For Level 1, scores on subscales 4 and 6 are both greater than on scale 5. For Level 2, scores on clinical scales 4 and 6 are both greater than 50, and on scale 5

less than 50. For Level 3, scores on subscales 4 and 6 are both greater than or equal to 65, and on subscale 4 less than 50. For Level 4, scores on subscales 4 and 6 are both greater than or equal to 65 and on subscale 5 less than or equal to 35.

V-Shaped Profiles: Hypotheses 8 and 9

At each level, two further null hypothesis were tested:

Hypothesis 8: The proportion of the anorectic subsample manifesting the V-shaped profile is not significantly different from what would be expected by chance.

Hypothesis 9: The proportion of the bulimic subsample manifesting the V-shaped profile is not significantly different from what would be expected by chance.

For Level 1, scores on subscales 4 and 6 are both greater than scale 5. The number of subjects whose score on scale 4 was higher than the score on scale 5 was 101 (.953) for anorectics and 241 (.964) for bulimics.

The number of subjects whose score on scale 6 was higher than the score on scale 5 was 94 (.887) for anorectics and 230 (.920) for bulimics.

The number of subjects whose scores on both scales 4 and 6 were above their score on scale 5 was 92 (.868) for anorectics and 227 (.908) for bulimics.

This, clearly, is an extremely high proportion of individuals showing the V profile. It is not, however, possible to estimate a population proportion against which to test this sample proportion statistically. Thus, the two hypotheses could not be tested at this level.

For Level 2, scores on clinical scales 4 and 6 are both greater than 50, and on scale 5 less than 50.

Of the 106 anorectic subjects, a total of 101 (.953) scored above 50 on scale 4; 93 (.877) scored above 50 on scale 6; and 77 (.726) scored below 50 on scale 5. The number of anorectic subjects scoring above 50 on each of scales 4 and 6 and below 50 on scale 5 was 66 (.623).

Of the 250 bulimic subjects, a total of 242 (.968) scored above 50 on scale 4; 232 (.928) scored above 50 on scale 6; and 183 (.732) scored below 50 on scale 5. The number of bulimic subjects scoring above 50 on each of scales 4 and 6 and below 50 on scale 5 was 166 (.664).

As the continuous normal distribution is used to test a hypothesis relating to a discrete distribution (integral scores only as the T-scores), the exact upper and lower limits must be used to obtain the proportion expected by chance.

Thus, the expected proportion greater than 50.5 on scale 4 is .4801. The expected proportion less than 49.5 on scale 5 is .4801 and the expected proportion greater than 50.5 on scale 6 is .4801¹. Thus, the expected proportion greater than 50.5 on scale 4, less than 49.5 on

scale 5, and greater than 50.5 on scale 6 is $(.4801)^3 = .111$.

For the anorectic subsample:

$$S_p = \sqrt{\frac{.623 \times .377}{106}} = .047$$

$$\text{Thus } z = \frac{.623 - .111}{.047} = 10.89$$

Similarly, for the bulimic subsample, $z = 18.43$. These two z -scores are highly significant. Hence, at level 2, both Hypotheses 8 and 9 are rejected. The proportion of subjects displaying the V profile is significantly greater than would be expected by chance.

For Level 3, scores on subscales 4 and 6 are both greater than or equal to 65, and on subscale 4 less than 50. This level is suggested by the profile of the means. Of the 106 anorectic subjects, a total of 74 (.698) scored 65 or above on scale 4; 59 (.557) scored 65 or above on scale 6; and 77 (.726) scored below 50 on scale 5.

A total of 39 subjects (.368) scored 65 or above on each of scales 4 and 6, and below 50 on scale 5. The proportion expected by chance is $(.0735)^2 \times .4801 = .0026$.

The z -test of the difference of .368 from the expected .0026 yields:

$$z = \frac{.368 - .0026}{\sqrt{\frac{.368 \times .632}{106}}} = 7.80$$

Of the 250 bulimic subjects, a total of 191 (.764) scored 65 or above on scale 4; 155 (.620) scored 65 or above on scale 6; and 183 (.732) scored below 50 on scale

5. A total of 97 subjects (.388) scored 65 or above on each of scales 4 and 6, and below 50 on scale 5.

The z -test of the difference of .388 from the expected .0026 yields:

$$z = \frac{.388 - .0026}{\sqrt{\frac{.388 \times .612}{250}}} = 12.50$$

Thus at Level 3, also, both Hypotheses 8 and 9 are rejected for both anorectics and bulimics. The proportion exhibiting the V profile is significantly greater than would be expected by chance.

For Level 4, scores on subscales 4 and 6 are both greater than or equal to 65 and on subscale 5 less than or equal to 35.

Of the 106 anorectic subjects, a total of 74 (.698) scored 65 or above on scale 4; 59 (.557) scored 65 or above on scale 6; and 18 (.170) scored 35 or below on scale 5. The total individuals scoring 65 or above on each of scales 4 and 6 and 35 or below on scale 5 was 10 (.094).

The expected proportion is $.0735^2 = .0004$.

The z -test of the difference of .094 from the expected .0004 yields:

$$z = \frac{.094 - .0004}{\sqrt{\frac{.094 \times .906}{106}}} = 3.30$$

Of the 250 bulimic subjects, a total of 191 (.764) scored 65 or above on scale 4; 155 (.620) scored 65 or above on scale 6; and 34 (.136) scored 35 or below on scale 5. The total individuals scoring 65 or above on each of

scales 4 and 6 and 35 or below on scale 5 was 22 (.088).

The z -test of the difference of .088 from the expected .0004 yields:

$$z = \frac{.088 - .0004}{\sqrt{\frac{.088 \times .912}{250}}} = 4.89$$

These z -scores are higher than the critical z of 1.96. Thus, at Level 4 also, Hypotheses 8 and 9 are rejected. The proportion of the anorectic and bulimic subsamples manifesting the V-shaped profile is significantly different from what would be expected by chance.

The data presented in this section are summarized in Table 10. The final column in this table gives the resultant z in testing the significance of the difference between the proportions in the anorectic and bulimic subsamples. In no case was this difference significant.

The Presence and Effect of Comorbidity

Could the V-shaped profile be a result of a diagnosis other than anorexia or bulimia nervosa? I decided to study this question in relation to the presence or absence of one or more of the DSM IV Axis I or II diagnoses: Generalized Anxiety Disorder, Bipolar Disorder, Dysthymia, Major Depressive Disorder, Obsessive-Compulsive Disorder, Chemical Dependency, Avoidant Personality Disorder, Dependent Personality Disorder, Borderline Personality Disorder, Histrionic Personality Disorder, Passive Aggressive Disorder, Narcissistic Personality Disorder,

TABLE 10

SUMMARY OF PRESENCE OF V PROFILE

Level	Anorectics ($\underline{n}=106$)	Bulimics ($\underline{n}=250$)	Test of difference of p's
1. #4 > #5 #6 > #5 #4 and #6 > #5	101 (.953) 94 (.887) 92 (.868)	241 (.964) 230 (.920) 227 (.908)	$\underline{z}=0.5$ $\underline{z}=1.0$ $\underline{z}=1.14$
2. #4 > 50.5 #5 < 49.5 #6 > 50.5 #4 and #6 > 50.5 and #5 < 49.5	101 (.953) 77 (.726) 93 (.877) 66 (.623)	242 (.968) 183 (.732) 232 (.928) 166 (.664)	$\underline{z}=0.68$ $\underline{z}=0.12$ $\underline{z}=1.55$ $\underline{z}=0.75$
3. #4 \geq 65 #5 < 49.5 #6 \geq 65 #4 and #6 \geq 65 and #5 \leq 49.5	74 (.698) 77 (.726) 59 (.557) 39 (.368)	191 (.764) 183 (.732) 155 (.620) 97 (.388)	$\underline{z}=1.29$ $\underline{z}=0.12$ $\underline{z}=1.11$ $\underline{z}=0.36$
4. #4 \geq 65 #5 \leq 35 #6 \geq 65 #4 and #6 \geq 65 and #5 \leq 35	74 (.698) 18 (.170) 59 (.557) 10 (.094)	191 (.764) 34 (.136) 155 (.620) 22 (.088)	$\underline{z}=1.29$ $\underline{z}=0.83$ $\underline{z}=1.11$ $\underline{z}=0.18$

Obsessive-Compulsive Personality Disorder, Schizoid Personality Disorder, Schizotypal Personality Disorder, or Antisocial Personality Disorder.

Table 11 gives the number and percentages of the anorectic and bulimic subsamples and of the total sample, which are dually diagnosed.

Diagnoses 1, 3, 8, 9, and possibly 4 are more strongly present than the others in both subsamples, and diagnoses 10 and 11 in the bulimic subsample. I therefore studied the effect of the presence or absence of these seven diagnoses on the existence of the V-shaped profile. I studied the effects at Levels 3 and 4 as identified in the last section.

Table 12 shows for the anorectic subsample ($n=106$), the proportion displaying the V profile among those with a comorbid diagnosis for Level 3. For each additional diagnosis, the proportion showing the V profile was obtained for those with the additional diagnosis and those without the diagnosis. In each case, the proportion was compared to the overall proportion of .368 of the anorectics manifesting the V profile. Not one of the 16 comparisons showed a statistically significant change from the overall proportion.

Table 13 shows, for the anorectic subsample ($N=106$), the proportion displaying the V-shaped profile among those with a comorbid diagnosis for Level 4. Of the 16 comparisons, there were not statistically significant.

TABLE 11
COMORBIDITY OF SAMPLE

Additional Diagnosis	Anorectics (<u>n</u> =106)	Bulimics (<u>n</u> =250)	Total (<u>n</u> =356)
Axis I			
1 Generalized Anxiety	4 (.038)	11 (.044)	15 (.042)
2 Bipolar Disorder	0	2 (.008)	2 (.006)
3 Dysthymia	7 (.066)	22 (.088)	29 (.081)
4 Major Depressive	3 (.028)	7 (.028)	10 (.028)
5 Obsessive Compulsive	0	0	0
6 Chemical Dependency	0	4 (.016)	4 (.011)
Axis II: Personality Disorders			
7 Avoidant	1 (.009)	6 (.024)	7 (.020)
8 Dependent	7 (.066)	13 (.052)	20 (.056)
9 Borderline	5 (.047)	21 (.084)	26 (.073)
10 Histrionic	1 (.009)	12 (.048)	13 (.037)
11 Passive Aggressive	0	9 (.036)	9 (.025)
12 Narcisstic	0	1 (.004)	1 (.003)
13 Obsessive Compulsive	2 (.019)	1 (.004)	3 (.008)
14 Schizoid	1 (.009)	4 (.016)	5 (.014)
15 Schizotypal	0	3 (.012)	3 (.008)
16 Antisocial	0	2 (.008)	2 (.006)

TABLE 12
MULTIPLE DIAGNOSIS AND V PROFILE (LEVEL 3)

Diagnosis	Anorectic Subsample			
	Present or Absent	<u>n</u>	<u>f</u> (proportion) with V	Significance of departure of proportion from .368
1. Generalized Anxiety	present	4	2 (.500)	<u>z</u> = 0.53
	absent	102	37 (.363)	<u>z</u> =-0.11
3 Dysthymia	present	7	1 (.143)	<u>z</u> =-1.70
	absent	99	38 (.384)	<u>z</u> = 0.33
4. Major Depressive	present	3	0 (0)	<u>z</u> =-1.32
	absent	103	39 (.379)	<u>z</u> = 0.23
8. Dependent	present	7	1 (.143)	<u>z</u> =-1.70
	absent	99	38 (.384)	<u>z</u> = 0.33
9. Borderline	present	5	1 (.200)	<u>z</u> =-0.94
	absent	101	38 (.376)	<u>z</u> = 0.17
1-6 Axis I	present	14	3 (.214)	<u>z</u> =-1.40
	absent	92	36 (.391)	<u>z</u> = 0.45
7-16 Axis II	present	15	4 (.267)	<u>z</u> = -.88
	absent	91	35 (.385)	<u>z</u> = 0.33
Any	present	18	4 (.222)	<u>z</u> =-1.49
	absent	88	35 (.398)	<u>z</u> = 0.57

Note. p = .368

TABLE 13
MULTIPLE DIAGNOSIS AND V PROFILE (LEVEL 4)

Diagnosis	Anorectic Subsample			
	Present or Absent	<u>n</u>	<u>f</u> (proportion) with V	Significance of departure of proportion from .094
1. Generalized Anxiety	present	4	2 (.500)	$\underline{z} = 1.62$
	absent	102	8 (.078)	$\underline{z} = -0.60$
3. Dysthymia	present	7	0 (0)	$\underline{z} = -0.85$
	absent	99	10 (.101)	$\underline{z} = 0.23$
4. Major Depressive	present	3	0 (0)	$\underline{z} = -0.56$
	absent	103	10 (.097)	$\underline{z} = 0.10$
8. Dependent	present	7	0 (0)	$\underline{z} = -0.85$
	absent	99	10 (.101)	$\underline{z} = 0.23$
9. Borderline	present	5	1 (.200)	$\underline{z} = 0.59$
	absent	101	9 (.089)	$\underline{z} = -0.18$
1-6 Axis I	present	14	2 (.143)	$\underline{z} = 0.52$
	absent	92	8 (.087)	$\underline{z} = -0.24$
7-16 Axis 2	present	15	2 (.133)	$\underline{z} = 0.44$
	absent	91	8 (.088)	$\underline{z} = -0.20$
Any	present	18	2 (.111)	$\underline{z} = 0.23$
	absent	88	8 (.091)	$\underline{z} = -0.10$

Note. $p = .094$

changes from the overall proportion. These findings suggest that the V profile is related to the eating-disorder diagnosis rather than to another diagnosis.

Table 14 shows, for the bulimic subsample ($N=250$), the proportion displaying the V profile among those with a comorbid diagnosis for Level 3. For each additional diagnosis, the proportion showing the V profile was obtained for those with the additional diagnosis and those without the diagnosis. In each case, the proportion was compared to the overall proportion of .388 of the bulimics manifesting the V profile. Of the 20 comparisons, just 2 showed a statistically significant change from the overall proportion. These were for the additional diagnoses of Major Depressive Disorder (Axis I) and Histrionic Personality Disorder (Axis II). Of those bulimics who were also diagnosed with Major Depressive Disorder, a significantly greater proportion than .388 displayed the V-shaped profile. Of those bulimics who were also diagnosed with Histrionic Personality Disorder, a significantly smaller proportion than .388 manifested the V-shaped profile.

In both of these significant comparisons, a problem arises from the presence of frequencies less than 5. There is only 1 without the diagnosis for scale 4 and 2 with the diagnosis for scale 10. It is usually considered that the z -test is appropriate for proportions only if all frequencies are at least 5. Therefore, I used chi-square

TABLE 14
MULTIPLE DIAGNOSIS AND V PROFILE (LEVEL 3)

Diagnosis	Bulimic Subsample			
	Present or Absent	<u>n</u>	<u>f</u> (proportion) with V	Significance of departure of proportion from .388
1. Generalized Anxiety	present	11	6 (.545)	<u>z</u> = 1.05
	absent	239	91 (.381)	<u>z</u> = -0.22
3. Dysthymia	present	22	11 (.500)	<u>z</u> = 1.05
	absent	228	86 (.377)	<u>z</u> = -0.34
4. Major Depressive	present	7	6 (.857)	<u>z</u> = 3.54*
	absent	243	91 (.374)	<u>z</u> = -0.45
8. Dependent	present	13	7 (.538)	<u>z</u> = 1.08
	absent	237	90 (.380)	<u>z</u> = -0.25
9. Borderline	present	21	10 (.476)	<u>z</u> = 0.81
	absent	229	87 (.380)	<u>z</u> = -0.25
10. Histrionic	present	12	2 (.167)	<u>z</u> = -2.05*
	absent	238	95 (.399)	<u>z</u> = 0.35
11. Passive Aggressive	present	9	3 (.333)	<u>z</u> = -0.35
	absent	241	94 (.390)	<u>z</u> = 0.06
1-6. Axis I	present	42	22 (.524)	<u>z</u> = 1.76
	absent	208	75 (.361)	<u>z</u> = -0.81
7-16 Axis II	present	68	29 (.426)	<u>z</u> = 0.63
	absent	182	68 (.374)	<u>z</u> = -0.39
Any	present	72	31 (.431)	<u>z</u> = 0.74
	absent	178	66 (.371)	<u>z</u> = -0.47

Note. $p = .388$

analysis for these two, where Yates' correction can accommodate small expected frequencies.

For scale 4, chi square = 4.65, which is still significant (critical chi square = 3.841). For scale 10, chi square = 1.64, which is not significant. Thus, only 1 of 20 comparisons showed significance, which could well be a Type I error with $\alpha = .05$. Table 15 shows, for the bulimic subsample ($N = 250$), the proportion displaying the V-shaped profile among those with a comorbid diagnosis for Level 4. In each case, the proportion was compared to the overall proportion of .088 of the bulimics manifesting the V profile. Of the 20 comparisons, there was one statistically significant finding on the existence of an axis I diagnosis. Of those bulimics who also have an axis I diagnosis, significantly more than .088 displayed the V-shaped profile.

Again, the small frequency in this comparison (as in some already non-significant comparisons) suggests that the normal distribution may be inappropriate. I therefore used the chi square test with Yates' correction. This yielded chi-square = 0.19, which is not significant. Thus, none of these 20 comparisons shows a significant change in the proportion exhibiting the V-shaped profile. Overall, 72 comparisons were made involving either the presence or absence of one or more additional diagnoses. Of these 72 comparisons only one showed a significant change in the proportion of bulimics exhibiting the V-shaped profile.

TABLE 15
MULTIPLE DIAGNOSIS AND V-PROFILE (LEVEL 4)

Diagnosis	Bulimic Subsample			
	Present or Absent	<u>n</u>	<u>f</u> (proportion) with V	Significance of departure of proportion from .088
1. Generalized Anxiety	present	11	1 (.091)	$\underline{z} = 0.03$
	absent	239	21 (.088)	$\underline{z} = 0.00$
3. Dysthymia	present	22	2 (.091)	$\underline{z} = 0.05$
	absent	228	20 (.088)	$\underline{z} = 0.00$
4. Major Depressive	present	7	2 (.286)	$\underline{z} = 1.16$
	absent	243	20 (.082)	$\underline{z} = -0.34$
8. Dependent	present	13	1 (.077)	$\underline{z} = -0.15$
	absent	237	21 (.089)	$\underline{z} = 0.05$
9. Borderline	present	21	1 (.048)	$\underline{z} = -0.86$
	absent	229	21 (.092)	$\underline{z} = 0.21$
10. Histrionic	present	12	0 (0)	$\underline{z} = -1.08$
	absent	238	22 (.092)	$\underline{z} = 0.21$
11. Passive Aggressive	present	9	0 (0)	$\underline{z} = -0.93$
	absent	241	22 (.091)	$\underline{z} = 0.16$
1-6. Axis I	present	42	5 (.119)	$\underline{z} = 2.22^*$
	absent	208	17 (.082)	$\underline{z} = -0.32$
7-16 Axis II	present	68	6 (.088)	$\underline{z} = 0.00$
	absent	182	16 (.088)	$\underline{z} = 0.00$
Any	present	72	6 (.083)	$\underline{z} = -0.15$
	absent	178	16 (.090)	$\underline{z} = 0.09$

Note. $p = .088$

Thus, it is safe to conclude that the presence of the profile is related to eating disorders rather than to comorbidity.

The comorbidity of the sample was also reflected in the mean profile (profile 1, p. 75). The elevation of scale 2 ($T = 75.11$) reflected the Dysthymia ($n = 29$) and Major Depressive Disorder ($n = 10$) comorbid cases in the sample. The 13 cases with the additional diagnosis of Histrionic Personality Disorder was also reflected in scale 3 elevations ($T = 68.85$). Taken together, scales 1, 2, and 3 also formed a configuration of interest. The elevations in scale 4 ($T = 73.75$) may reflect problems of impulsivity seen in eating disorders.

Scales 1, 2, and 3 formed a configuration similar to what Greene (1980) describes as the neurotic triad (i.e., caret). The neurotic triad's main feature is the elevation on scale 2 with all three scales being elevated (Greene, 1980). In this research only scale 2 reached clinical significance ($T = 75.11$) while scales 1 ($T = 66.47$) and 3 (68.85) were just below clinical significance. However, scale 2 is elevated and forms a pattern similar to the neurotic triad.

Greene (1980) described individuals with this profile as experiencing multiple somatic complaints, depression, and hysteroid features. Frequently such clients are overcontrolled emotionally and may report feeling fatigued and anxious. Individuals with this configuration are often

described as dependent and immature. Many of the characteristics attributed to individuals with this configuration are also found in eating disorder victims, particularly the feelings of anxiety, depression, and problems with direct expression of feelings.

The elevation of scale 2 reflected the depression and dysthymia experienced by eating-disordered individuals in this sample. Given the fact that depression is a predisposing factor to the development of eating disorders, this finding was expected. It is also interesting to note that dysthymia appeared to be more common than depression in this sample. These results may suggest that dysthymia is more common than major depressive disorder in the eating-disorder population.

The elevations on scale 4 may have represented the comorbid diagnosis of dependent personality disorder. Since there were few antisocial personality-disorder comorbid diagnoses, scale 4 may reflect impulsivity rather than antisocial aspects of the sample. Given the impulse issues inherent in eating-disordered persons, the elevation on scale 4 is consistent.

Summary

Of the 12 null hypotheses tested, 8 were rejected and 4 were retained. When analyzed, Hypothesis 1 produced non-significant results and the null hypothesis was retained. Thus, the two subsample profiles are parallel and on the

same level.

Hypotheses 2 and 3 addressed the difference of the profiles of the anorectic and bulimic subsamples from that of the normal population. Both of these were rejected. Thus both the anorectic and bulimic profiles depart significantly from the flat profile of the normal population.

Hypotheses 4 and 5 proposed that the mean score of the anorectic and bulimic subsample does not differ significantly from the population mean of 50 on each of the scales. Both Hypotheses 4 and 5 were rejected. The mean scores for the anorectic and the bulimic subsamples differ significantly from the population mean of 50 on each of the scales.

Hypotheses 4a and 5a yielded significant results and were rejected. For both anorectic and bulimic subsamples, the median score on each variable is significantly less than 50 on the Masculine-Femininity scale, and significantly above 50 on the other nine scales.

Hypothesis 6 yielded nonsignificant findings for each scale. Thus, the null hypothesis stating that the means of the anorectic and bulimic subgroups will not significantly differ from each other on any clinical scale of the MMPI is retained.

Hypothesis 6a stated that there is no significant difference between the medians of the anorectic and bulimic subsamples on any of the 10 scales. The low chi-square

values produced nonsignificant findings. Therefore, for each scale, the null hypothesis is retained. There is no significant difference between the medians of the anorectic and bulimic subsamples.

Hypothesis 7 stated that there is no linear combination of the 10 clinical scales which significantly discriminates between the centroids of the bulimic and anorectic subsample. Discriminant analysis yielded nonsignificant findings. Thus, the null hypothesis stating that there is no linear combination of the 10 clinical scales which significantly discriminates between the bulimic and anorectic subsample is retained.

I studied the V-shaped profile for clinical scales 4, 5, and 6 at several levels.

For Level 1, scores on subscales 4 and 6 are both greater than scale 5. For Level 2, scores on clinical scales 4 and 6 are both greater than 50, and on scale 5 less than 50. For Level 3, scores on subscales 4 and 6 are both greater than or equal to 65, and on subscale 4 less than 50. For Level 4, scores on subscales 4 and 6 are both greater than or equal to 65 and on subscale 5 less than or equal to 35.

At each level, two further null hypotheses were tested:

Hypothesis 8: The proportion of the anorectic subsample manifesting the V-shaped profile is not significantly different from what would be expected by

chance.

Hypothesis 9: The proportion of the bulimic subsample manifesting the V-shaped profile is not significantly different from what would be expected by chance.

Hypotheses 8 and 9 were rejected at Level 2. The proportion of both anorectics and bulimic subjects displaying the V-shaped profile is significantly greater than would be expected by chance.

At Level 3, both Hypotheses 8 and 9 were rejected. The proportion of both anorectics and bulimics exhibiting the V-profile is significantly greater than would be expected by chance.

Hypotheses 8 and 9 were also rejected at Level 4. The proportion of the anorectic and bulimic subsamples manifesting the V-shaped profile is significantly different from what would be expected by chance.

Comorbidity of the sample was also tested at Levels 3 and 4 for the existence of the V-shaped profile and the presence or absence of prominent diagnoses. In the anorectic subsample at Level 3, not 1 of the 16 comparisons showed a statistically significant change from the overall proportion.

For the anorectic subsample at Level 4, there were no statistically significant changes from the overall proportion. These findings may suggest that the V profile is related to the eating-disorder diagnosis rather than to

another diagnosis.

For the bulimic subsample at Level 3, one showed a statistically significant change from the overall proportion. This was for the additional diagnosis of Major Depressive Disorder (Axis I). Overall, the presence of an additional diagnosis has little effect on the proportion showing the V-shaped profile.

For the bulimic subsample at Level 4, there was no statistically significant finding on the existence of an Axis I diagnoses. Thus, only 1 of 72 comparisons yielded a significant change from the proportion of the overall group of anorectics or bulimics manifesting the V-profile. This V-profile can therefore be attributed to the eating disorder rather than to the presence or absence of comorbidity.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter first summarizes the problem and purpose of the study, the literature review, the methodology, and results. The results are then discussed and conclusions drawn. Finally, recommendations are made for practice and for further research.

Summary

Problem and Purpose

The American Anorexia/Bulimia Association (1997) estimated that more than 5 million Americans suffer from eating disorders. Research on eating disorders has yielded diagnostic criteria, treatment modalities, and symptom identification assessments. However, accurate assessment at early stages of these disorders remains a challenge, particularly for bulimic individuals whose physical appearance may remain unchanged.

To prevent entrenchment of these diseases, early diagnosis and treatment are desirable. However, many times individuals do not seek treatment until the disease is severely entrenched. The victims' denial, shame, guilt, or fear may prevent them from seeking treatment to deal with

their eating disorder. Sometimes, financial barriers may also prevent victims from seeking needed treatment (Brownwell & Fairburn, 1995). Many authors stress the significance of early detection for successful intervention and treatment (Morgan & Russell, 1975; Pierloot et al., 1975; Slade & Dewey, 1986).

Thus, the issue of identifying individuals suffering from an eating disorder prior to entrenchment of the disease remains a challenge. Existing eating-disorder instruments such as the EAT, EDI, BULIT, and Binge Eating & Cognitive Factors Scales have been devised to help accurately assess eating disorders. These instruments, however, are symptom specific to eating disorders and transparent. Additionally, these instruments are designed to assess rather than screen for eating disorders.

The MMPI has long been recognized as a primary screening instrument for overall psychopathology (Williamson, 1990). Because of its utility as a general screening device, the impact of comorbidity can also be addressed in this research. Further examination of the 4-5-6 configuration on the MMPI as well as scales 2 and 7 in an eating-disorder population is warranted to possibly identify the existence of an eating-disorder pattern. Identifying a significant configuration which would screen for eating disorders on the MMPI may allow for early intervention and successful treatment.

It was expected that scales 2 and 7 would be

elevated, since scale 2 measured depression and scale 7 measured anxiety and obsessive/compulsive-type characteristics, which are also symptoms of eating disorders. However, these symptoms are also found in other psychiatric illnesses. Thus, the 4-5-6 V-shaped configuration was also analyzed since it also measures symptoms found in eating disorders, but may not have been quite as common in other disorders.

Literature Review

Research on the MMPI and eating disorders revealed that the MMPI has been used to develop a better understanding of the personality features of women suffering from eating disorders. Comparison groups such as schizophrenics, substance/drug abusers, incest survivors, major depressive disorder, and other clinical populations have been compared to anorectic or bulimic subjects to identify personality characteristics specific to eating-disorder victims (Lilenfeld, 1995).

Research results pertaining to the existence of an eating-disorder pattern on the MMPI remain equivocal. Past research has found that when mean profiles for bulimic subjects were examined, typically scales 2, 4, 7, and 8 were elevated (Bulik et al., 1992; Hatsukami et al., 1982; Kolotin et al., 1987; Norman & Herzog, 1983). Scales 2, 4, 6, 7, and 8 were also often elevated among anorectic subject samples (Biederman et al., 1986; Casper et al.,

1992; Norman & Herzog, 1983; Scott & Baroffio, 1986; Scott & Thoner, 1986; Shisslak et al., 1990; Small et al., 1981). These elevations suggest possible problems with depression, impulsivity, anxiety, social withdrawal, and disturbed thinking among bulimic women. In addition to these symptoms, anorectic women may experience problems of hypersensitivity and excessive rigidity (Lilenfeld, 1995).

There appears to be consistency on certain scale elevations among studies which may identify an eating-disorder pattern. Findings from past research support the existence of a possible V-shaped eating-disorder configuration with elevations on scales 4 and 6 combined with a significantly lower scale 5 T-score (Norman & Herzog, 1983; Pendleton et al., 1990; Shisslak et al., 1990). Additionally, elevations on scales 2 and 7 (Biederman et al., 1986; Casper et al., 1992; Norman & Herzog, 1983; Scott & Baroffio, 1986; Scott & Thoner, 1986; Small et al., 1981) may also reflect the symptoms of depression and obsessional-type thinking commonly experienced by a subgroup of the eating-disordered population.

With the exception of Pendleton's research, most studies on the MMPI and eating disorders have focused on high point elevations rather than a specific configuration (Casper et al., 1992; Dykens & Gerrard, 1986; Norman & Herzog, 1983; Shisslak et al., 1990). Graham (1990) noted that the configural interpretation of a subject's scores

were diagnostically richer and thus more useful than an interpretation that examined single scales without regard for relationships among scales. In addition to looking at scale elevations, this research focused on the possible existence of the 4-5-6 V-shaped profile.

The 4-5-6 configuration is evident when scales 4 and 6 are above a T-score of 65 and scale 5 is below a T-score of 35 (Greene, 1980). Greene (1980) also noted that scales 4 and 6 need not be the high points on the profile for the configuration to exist.

Greene (1980) described women with the 4-5-6 configuration as angry, hostile and unable to directly express these feelings. Webb et al. (1981) noted that a low T-score of 40 on scale 5 found in women with the code of 46/64 often appears to be associated with a passive-aggressive personality. Newark (1979) has described women with this configuration to be angry and unable to express these feelings directly, leading to a high degree of passive-aggressiveness.

Indirect expression of anger is a characteristic associated with the development of eating disorders. Johnson and Connors (1987) noted that most bulimic women avoid expressing angry feelings directly due to fear of interpersonal disapproval or rejection. Striegel-Moore et al. (1986) have described bulimic women as unassertive and eager to please. Root et al. (1986) have also described bulimic women's problems with anger and that recovery

entails appropriate expression of these feelings.

The issue of comorbidity not being addressed in these studies appears to be a major weakness in past research. Comorbidity may explain the equivocal findings of past research in attempting to identify an eating-disorder profile or configuration. It is important to note the influence of comorbidity when attempting to identify an eating-disorder pattern on the MMPI. Since the MMPI is a general measure of psychopathology, the issue of comorbidity can be identified as well as addressed in the present research.

The purpose of this research is to identify the MMPI as an appropriate screening tool for eating disorders through detection of a significant V-shaped pattern on scales 4-5-6. Identifying an eating-disorder pattern on the MMPI could assist the clinician to use more specific instruments targeting on eating disorders to rule out or confirm diagnosis. This is particularly significant in dealing with shame and guilt-ridden bulimic individuals who may be reluctant to seek out treatment (Brownwell & Fairburn, 1995).

Methodology

The sample for this research consisted of 356 adult females who sought treatment through the HOPE Program of Memorial Hospital in South Bend, Indiana, between 1989 and 1996. Male subjects were excluded from this study. Two

hundred and fifty of the subjects met the diagnostic criteria for bulimia, and 106 subjects met the diagnostic criteria for anorexia nervosa. These subjects completed the MMPI as part of a psychological assessment performed by the consulting psychologist. Diagnostic criteria were from the DSM-III-R and DSM-IV.

The grouping variables of this research were the diagnosis of anorexia or bulimia suffered by the client. The dependent variables were the clinical scales on the MMPI: Hypochondrias (1), Depression (2), Hysteria (3), Psychopathic Deviate (4), Masculinity-Femininity (5), Paranoia (6), Psychasthenia (7), Schizophrenia (8), Hypomania (9), and Social Introversion (0). Particular focus was on scales 4, 5, and 6 as a group, and scales 2 and 7 separately.

The MMPI was the instrumentation used in this research. It is a widely used and researched objective personality inventory (Greene, 1980). Originally devised by Hathaway and McKinley in 1940, the MMPI provides an objective means of assessing abnormal behavior. The subjects in this research took the booklet form of the MMPI and responded to 566 statements as either "true" or "false." The subject's responses were then scored on the 10 previously mentioned clinical scales that assess major categories of abnormal behavior.

In 1989, the MMPI was revised significantly and renamed the MMPI-2. The MMPI-2 is similar in many ways to

the original MMPI. Improvements of the original MMPI include a more representative sample, improved and updated items, some new scales, and deletions of objectionable items (Graham, 1990). Additionally, much of the research generated from the original MMPI still applies directly to the MMPI-2 (Graham, 1990).

Results

The results are summarized in relation to the null hypotheses.

Hypothesis 1: The profiles of the anorectic and bulimic subsamples are not significantly different from each other.

Hypothesis 2: The profile of the anorectic subsample is not significantly different from that of the normal population.

Hypothesis 3: The profile of the bulimic subsample is not significantly different from that of the normal population.

Profile analysis indicated that the profiles of the anorectic and bulimic subsamples were parallel and at the same level. Thus Hypothesis 1 was retained. The combined profile of the sample is not flat. Thus, Hypotheses 2 and 3 were rejected. The profiles of the eating-disorders subgroups are significantly different from that of the normal population.

The sample subgroups were compared to the norms scale

by scale, using both means and medians, as extreme scores could be affecting the means.

Hypothesis 4: The mean score of the anorectic subsample does not differ significantly from the population mean of 50 on each of the scales.

Hypothesis 5: The mean score of the bulimic subsample does not differ significantly from the population mean of 50 on each of the scales.

Hypothesis 4a: For the complete subsample of anorectics, the median score is 50 on each scale.

Hypothesis 5a: For the complete subsample of bulimics, the median score is 50 on each scale.

All four hypotheses were rejected. The mean and median of each subsample differed significantly from those of the normal population on each of the 10 scales. They are significantly low for scale 5 and high for the other 9 scales.

The two subsamples were compared to each other, also using both means and medians.

Hypothesis 6: The means of the anorectic and bulimic subsamples will not significantly differ from each other on any clinical scale.

Hypothesis 6a: There is no significant difference between the medians of the anorectic and bulimic subsamples on any of the 10 scales.

Both hypotheses were retained. The two subsamples do

not differ from one another on any scale, with respect to either mean or median.

Discriminant analysis was used to compare the two subsamples multivariately.

Hypothesis 7: There is no linear combination of the 10 clinical scales which significantly discriminates between the centroids of the bulimic and anorectic subsamples.

This hypothesis was retained.

The presence of the V-shaped profile was studied at four levels.

1: Scores on subscales 4 and 6 are both greater than on scale 5.

2: Scores on subscales 4 and 6 are both greater than 50, and on scale 5 less than 50.

3: Scores on subscales 4 and 6 are both greater than or equal to 65, and on subscale 4 less than 50.

4: Scores on subscales 4 and 6 are both greater than or equal to 65, and on subscale 5 less than or equal to 35.

At each level, two hypotheses were tested.

The first level is a simplistic one. The second and third levels are at increasing levels of complexity. The fourth level is the one suggested by Greene (1980).

Hypothesis 8: The proportion of the anorectic subsample manifesting the V-shaped profile is not significantly different from what would be expected by chance.

Hypothesis 9: The proportion of the bulimic subsample manifesting the V-shaped profile is not significantly different from what would be expected by chance.

Both Hypotheses 8 and 9 were rejected at all four levels. The proportion of both anorectic and bulimic subsamples manifesting the V profile is significantly greater than would be expected by chance.

The presence of comorbidity and its effect on the presence of the V profile were studied, using the 16 diagnoses of Axis 1 and 2 of the DSM-III-R and DSM-IV. One or more of these additional diagnoses were present in a small proportion of both subsamples. However, they had no significant effect upon the proportion of anorectics and only slight effect upon the proportion of bulimics manifesting the V-profile. The presence of this profile appears to be due to the eating disorders rather than any comorbidity.

Discussion

The results of this research produced several significant findings and supported the existence of a V-shaped profile on the clinical scales of the MMPI for an eating-disorder sample. Although the V-shaped pattern was expected, some of the findings produced were very interesting.

Elevations on many of the scales were expected since these scales measure common symptoms found in eating

disorders. Of particular interest in this research were scales 2 and 7 and the V-shaped profile of 4-5-6. This research supported previous findings (Norman & Herzog, 1983; Pyle, Mitchell, & Eckert, 1981) in that there were significant elevations on scales 2, 4, 6, 7, and 8 in over 50% of the subjects. Eighty percent of the subjects produced clinically significant scale 2 elevations. This was expected given that a common symptom of eating disorders is depression. Past research with eating disorders and the MMPI has found scale 2 elevations. Thus, these results correspond with the belief that many eating-disordered individuals show symptoms of a mood disorder (Norman & Herzog, 1983; Hudson, Pope, Yurgelun-Todd, Jonas, & Frankenburg, 1983; Johnson & Larson, 1982; Pope & Hudson, 1982; Pyle et al., 1981).

People with eating disorders frequently experience symptoms of depression. Studies of anorectic and bulimic patients have revealed feelings of hopelessness, guilt, worthlessness, irritability, lowered mood, concentration impairment, sleep and eating pattern disturbance. In the case of anorectics, the depressive symptoms may be secondary to the disorder resulting from the significant weight loss (Keys et al., 1950). In the case of bulimics, depression may be caused by loss of control over eating and extreme concerns about body image and weight. The bulimic also has the additional component of guilt and shame over the secrecy of her deceit (Cooper, 1995).

Some research has suggested that depression predisposes individuals to eating disorders (Garner & Garfinkel, 1979; McFarland, 1995). Several studies of the prevalence of psychiatric disorders among the first-degree relatives of patients with eating disorders have revealed higher than normal rates of major depressive disorder, especially among mothers of patients (Cooper, 1995). In some instances, depression may occur because of a biological or genetic predisposition and result in an eating disorder. This research supports past findings in that individuals suffering from eating disorders also experience depression.

Sixty-two percent of the subjects had a significant elevation on scale 3. Graham (1990) suggests that persons with elevated scores on scale 3 may react to stress and avoid responsibility by developing symptoms. He also notes that a salient feature of the high scale 3 score is poor insight concerning feelings and motives. Poor stress management is a key issue in treating eating-disorder victims. Many times these individuals deal with stress through food restriction or bingeing and then use compensatory measures (i.e., purging, laxative abuse) to control weight. In treatment, identifying other ways to manage stress is a key factor in the recovery process.

Additionally, many individuals suffering from eating disorders have limited insight into feelings. For these individuals their feelings are expressed indirectly through

food restriction or bingeing. Thus, scale 3 may have tapped into the individual's lack of insight and inability to verbalize feelings in a direct manner in addition to poor stress management style.

Seventy-four percent of the subjects reached or exceeded clinical significance on scale 4 (psychopathic deviate). This scale was of particular interest in terms of its relationship to scales 5 and 6 in completing the V-shaped profile. However, these elevations are not a surprise since this scale identifies social maladjustment and impulse issues.

For the eating-disorders population, impulse issues are key components to the disorders. The issue of control is salient in both anorexia and bulimia. For the anorectic, loss of control, or impulsivity, leads to restriction and, in some cases, excessive exercise is used for compensation. For the bulimic, loss of control results in binge-eating and compensatory behaviors of purging, and laxative abuse. The impulsivity perceived by the anorectic or experienced by the bulimic can be identified through food behavior. In essence, they attempt to regain control through manipulating their food intake.

Social adjustment is another issue measured on scale 4. Many times the eating-disorder individual experiences social maladjustment problems. The food and binge-eating rituals may begin to affect relationships. Trying to maintain complete control over food intake makes eating out

with others problematic. The food becomes the eating-disordered individual's sole focus, leaving interest in other areas of life at a minimum.

The expressed concern of friends is met with strong denial or shame. This can result in the victims withdrawing from others. In order to avoid future confrontations, victims become socially withdrawn and more focused on food to deal with the stress of problems in relationships.

Scale 6 is of interest because of its relationship to scale 4 as being part of the hypothesized V-shaped eating-disorder pattern. Sixty percent of the subjects scored at a clinically significant level on this scale. Elevations on this scale suggest a tendency to be excessively sensitive and overly responsive to opinions of others (Graham, 1990). This scale taps into some key components of self-esteem. The literature confirms that eating-disorder clients suffer from low self-esteem (Root et al., 1986; Striegel-Moore et al., 1986).

Research suggests that people's level of self-esteem may impact their eating behaviors (McFarland, 1995; Polivy, Heatherton, & Herman, 1988). The results of Polivy et al.'s (1988) research suggests that high self-esteem is associated with less disinhibited eating and that repeated dietary failure can impact self-esteem. For many eating-disordered individuals, self-esteem is further impaired over the course of many attempts to control behavior. This

perceived failure reinforces the bulimics' perceived inadequacies. This negative cycle perpetuates a sense of helplessness and despair (McFarland, 1995). It is not surprising, therefore, that scale 6 was elevated since it taps into sensitivity and self-esteem.

Sixty-six percent of the subjects reached clinical significance on scale 7 (psychasthenia). It was hypothesized that this scale would reach clinical significance since this scale taps into anxiety experienced by many eating-disordered individuals. Fear of fat is the driving force behind eating disorders. Anxiety develops when attempts to control the fear of fat fails. The central features of the eating disorders that produce anxiety in individuals are a fear of social situations, a fear of having one's body exposed to scrutiny, and a fear of certain foods (Cooper, 1995).

Sometimes eating-disordered individuals develop a fear around certain foods. Foods high in fat or sugar are often feared and avoided in attempts to control weight. As the fear increases, the individuals' eating behavior changes and may become apparent to others. Many times obsession with foods and compulsions with eating habits develop in attempts to deal with the anxiety.

Eating in social situations is feared because of the lack of control the victim has in deciding on the choices as well as limiting opportunities to purge if desired. Social situations intensify the individuals' anxiety level

since they feel that they have limited control over the situation.

Body image disturbance is also a common cause of anxiety among eating-disorder victims. Many times victims focus on aspects of their body which they do not like. This focus dominates their entire feeling towards their body. This research supports previous findings (Casper et al., 1992; Cooper, 1995; Norman & Herzog, 1983; Pyle, Halvorson, Newman, & Mitchell, 1986; Root & Friedrich, 1989) that identify anxiety as a common symptom experienced by the eating-disorders population.

Fifty-four percent of subjects scored at a clinically significant level on scale 8. Elevations of scale 8 may be indicative of individuals experiencing acute psychological turmoil and who may be unable to express negative feelings (Graham, 1990). Problems identifying and expressing feelings in a direct manner are a component in the development of eating disorders (McFarland, 1995).

Individuals suffering from eating disorders also report a great deal of psychological turmoil resulting from anxiety, depression, and interpersonal difficulties. The denial inherent in anorectic individuals makes identifying negative feelings difficult. Poor insight also makes expressing negative feelings difficult if not impossible. For bulimic individuals, psychological turmoil also results from depression, anxiety, and low self-esteem. Having the confidence to express negative feelings is extremely

difficult for bulimic individuals. These issues also impact social relationships and may result in interpersonal difficulties.

Scale 5 is also of interest in that it is part of the hypothesized eating-disorder pattern. The expected mean T-score would be 50. The actual mean T-score of 45.17 for the entire group was shown to be different from the normal population at a statistically significant level. The results of this research suggest that eating-disordered women may score slightly lower than the expected mean of 50 on scale 5.

However, despite this statistical significance on scale 5, it is important to note that there is also a great deal of overlap between the normal and eating-disorder population on this scale. Thus, it is possible that non-eating-disordered women may score in this statistically significant range. Therefore, scale 5 should not be used alone but in conjunction with scales 4 and 6 to screen for the possible existence of eating disorders.

Also of interest was the 14% of subjects who scored below 35 on scale 5. Graham (1990) notes that women with a low scale 5 score may be described as passive and submissive. These findings were expected since many times eating-disordered victims have difficulty with assertiveness (Piran, Langdon, Kaplan, & Garfinkel, 1989). Thus, these low scale 5 scores may have tapped into the passive characteristics of some of the individuals

suffering from eating disorders.

Results of this research suggest that the eating-disorder subsamples were not significantly different from each other but were different from the normal population. Further analysis of the means revealed that there were significant differences on the means and medians from the normal population mean of 50 on each scale. These results identify some significant differences on the clinical scales of the MMPI between the eating-disorder sample and normal population. A V-shaped eating-disorder pattern of 4-5-6 on the clinical scales was hypothesized to be the difference between the profiles of the normal and eating-disorder population. This pattern was defined by four different levels in which the subscales were defined by specific T-scores.

Level 1 focused on the existence of the V shape. Level 2 set the T-scores of scales 4 and 6 as greater than 50 and scale 5 less than 50. Level 3 identified the T-scores at greater than or equal to 65 for scales 4 and 6, and less than 50 on scale 5. Level 4 defined the V-shaped profile when scales 4 and 6 were greater than or equal to 65, and less than 35 on scale 5.

On all levels, results indicated that the proportions of the anorectic and bulimic individuals manifesting the V-shaped profile was significantly greater than what would be expected by chance. Thus, it appears from this research that the 4-5-6 V-shaped pattern on the clinical scales of

the MMPI may be identified as a significant screening pattern in the eating-disorders population.

This pattern was hypothesized because it was believed that scales 4 and 6 tapped into key components of impulse control and social maladjustment at the core of eating disorders. Greene (1980) identified this pattern as indicative of women who were more passive and possibly more dependent on men.

Graham (1990) describes women with the 46/64 code type as overly identified with the traditional female role and very dependent on males. Many times these individuals are suspicious of others and avoid deep emotional involvement. Anger and repressed hostility are also characteristic of these individuals. Individuals with this code type tend to deny serious psychological problems.

Because passivity and dependence are also characteristic of eating disorders, it was assumed that this pattern may also be present in an eating-disorder population. Issues of control and relational difficulties are also common in eating disorders. Additionally, the lack of emotional insight combined with the inability to express anger directly are also identified as characteristics of eating disorders. Since these characteristics also describe individuals with the 46/64 code type and eating disorders, it was hypothesized that this pattern may also be indicative of individuals suffering from eating disorders. The results of this

research support the existence of the 4-5-6 pattern on the MMPI in an eating-disorder population.

Contrary to Casper et al.'s (1992) research, this study found the profiles of bulimic and anorectics to be similar and to reach clinical significance (T-score of 70 or greater). Casper et al. (1992) found that bulimic individuals reached clinical significance on scales 4 and 6. In contrast, the bulimic anorectics scored in the high normal range on scales 4 and 6. The anorectic group scored in the high normal range on scales 4 and 6 as well. Casper et al.'s results supported previous research (Biederman et al., 1986; Hatsukami et al., 1982; Norman & Herzog, 1983) in finding a more dramatic profile for bulimic individuals and a more restrictive profile for anorectic individuals.

In this research, both of the anorectic and bulimic groups reached clinical significance on scales 4 and 6. The difference in these two studies may be for several reasons. My sample of 356 had greater power to find significance than Casper et al.'s sample of 50. The status of the patient also may have made a difference. In Casper et al.'s research (1992), the sample consisted of all inpatient subjects. In the present research, the sample consisted of inpatient and outpatient individuals. Perhaps the patient status had an influence on the differences found in the profiles. Inpatient subjects may tend to exhibit more severe symptomology of the eating disorder, which necessitates hospitalization. The impact of patient

status on the existence of the V-shaped profile was not studied in this research, therefore, its exact impact remains unknown.

The similarity found between the anorectic and bulimic profiles in this research may provide support for the issue that, although the eating disorders express themselves very differently, the psychological dynamics underlying both disorders are similar. It appears from this research that both subsamples experience depression, anxiety, low self-esteem, interpersonal difficulties, and psychological turmoil.

The issue of comorbidity was also addressed in this research. The existence of the V-shaped pattern at Levels 3 and 4 and the impact of comorbid diagnosis on the existence of the V-shaped profile were studied. Results showed that comorbidity had little impact on the existence of the V-shaped pattern. For the bulimic subsample at Level 3, there was some impact on the existence of the V-shaped profile when the individual also had the diagnosis of Major Depressive Disorder.

A significantly greater proportion of bulimic individuals with Major Depressive Disorder exhibited the V-shaped pattern. This is not surprising when looking at how these diagnoses overlap with what these scales measure. Scale 4 is a measure of general social maladjustment and scale 6 measures interpersonal sensitivity, suspiciousness, and self-righteousness (Graham, 1990).

These scales measure similar characteristics found in both diagnoses. For example, depression would influence social maladjustment as well as interpersonal sensitivity and suspiciousness. Also of interest is the fact that significance occurred only with the bulimic population. Previous research has supported the suggestion that bulimic individuals tend to have a more expressive MMPI profile (Casper et al., 1992). These findings may support this identified difference between bulimic and anorectic individuals. The results of this research may also suggest that the existence of the V-shaped profile is possibly related to an eating-disorder diagnosis rather than a comorbid diagnosis.

Research Questions

This study sought to address several questions identified in chapter 1.

Question 1: Do either anorectic or bulimic individuals differ from the general population?

Rejection of Null Hypotheses 2 and 3 leads to the conclusion that the profiles of the anorectic and bulimic subsamples significantly differ from the normal population.

Question 2: Do anorectic subsamples differ from bulimic subsamples on the MMPI?

Retention of Null Hypothesis 1 follows from the finding that the anorectic and bulimic subsamples were parallel and on the same level, thereby suggesting that the

subsamples do not differ significantly from each other.

Question 3: Are there patterns involving the clinical subscales 4, 5, and 6?

The V-shaped pattern was studied on several levels in which the subscales were defined by specific T-scores. Level 1 focused on the existence of the V shape. Level 2 set the subscales 4 and 6 at greater than 50 and scale 5 less than 50. Level 3 set the T-scores at greater than or equal to 65 for scales 4 and 6 and less than 50 on scale 5. Level 4 focused on the existence of the V-shaped profile in which scales 4 and 6 were greater than or equal to 65 and scale 5 was less than or equal to 35. On all levels, results indicated that the proportion of the anorectic and bulimic subsamples manifesting the V-shaped profile was significantly higher than what would be expected by chance. Thus, it appears from this research that the 4-5-6 V-shaped pattern on the clinical scales of the MMPI may be identified as a significant screening pattern in the eating-disorders population. This eating-disorder pattern may serve to further assess for an eating disorder if it is identified in an individual's profile.

Question 4: Are there significant elevations on scales 2 and 7?

The results indicated that 285 (.80) of the 356 subjects had an elevation of 65 or greater on scale 2. The anorectic subsample had significant elevations on scale 2 for 86 (.81) of the 106 individuals. The bulimic subsample

had significant elevations of 65 or greater on scale 2 for 199 (.80) of the 250 individuals.

On scale 7, the results suggested that 236 (.66) of the 356 profiles had elevations of 65 or greater. The anorectic subsample had significant elevations on scale 7 for 69 (.65) of the 106 individuals. The bulimic subsample had significant elevations of 65 or greater on scale 7 for 167 (.68) of the 250 individuals. These results indicate that there were significant elevations on both scales 2 and 7 for both the anorectic and bulimic subsamples.

Strengths in this research include the large sample size, the sample selection process, as well as the attempt to address the impact of comorbidity on the findings. The large outpatient sample with an age range from adolescence through middle age increases the extent to which results can be generalized. This research also improves upon the methodological weaknesses of accurate diagnosis through the use of the DSM-III-R and DSM-IV diagnostic criteria utilized by the licensed psychologist at the HOPE program. Additionally, addressing the issue of comorbidity in this research greatly reduces the possibility that the V-shaped profile resulted from a diagnosis other than an eating disorder.

Conclusion

This research supports the possibility of using the MMPI as a screening device in eating-disorder assessment.

Results of this research suggest that the 4-5-6 profile may be indicative of the existence of an eating disorder and warrant further assessment.

Implications for Practice

The clinical implications of these results are also interesting. The focus of this research was to identify a pattern that could be used in screening out eating-disorder individuals from the general psychiatric population. Four different levels of the V-shaped profile were studied. Table 17 summarises the clinical implications of this research.

At Level 1, .896 of the eating-disorders population

TABLE 16
CLINICAL IMPLICATIONS

Level	E.D. Population w/V shaped Profile	E.D. Population w/V shaped Profile	Expected in General Population
Level I 3,6>5	89%	11%	<25%
Level II 4,6>50 5>50	65%	35%	11%
Level III 4,6≥65 5<50	38%	62%	31 of 1,000
Level IV 4,6≥65 5≤35	9%	91%	4 of 1,000

had the V-shaped profile whereas in the normal population less than .25 would be expected to have the V-shaped profile. By using this profile as the only criterion in screening for eating disorders, .11 of the eating-disorders subpopulation would be missed.

At Level 2 in this research, .65 had the V-shaped profile whereas in the normal population .11 would be expected to have the V-shaped profile. As we do not know the proportion of the population who are seeking professional help it is not possible to predict the proportion of false positives. However, it is clear that if one were to use only the V-shaped profile as the only indicator of eating disorders, .35 of the eating-disorders subpopulation would not be identified.

At Level 3, .38 of the eating-disorders population had the V-shaped profile whereas in the normal population less than .0026 would be expected to have the V-shaped profile. Thus, approximately .62 of the eating-disorder population would be missed but less than approximately 3 of 1000 of the general population would exhibit the V-shaped profile.

Obviously, using Levels 2 or 3 will decrease the possibility of falsely identifying an individual as suffering from eating disorders. However, it will also increase the risk of not screening those individuals who are prone to eating disorders.

At Level 4, .09 of the eating-disorder population had

the V-shaped profile whereas in the normal population less than .0004 would be expected to have it. This level would help identify only those individuals suffering from an eating disorder. However, because of the more conservative criterion the chances are greater that it would also miss some individuals who are in fact suffering from eating disorders.

Levels 1 and 2 would screen adequately in an eating-disorders population and could possibly be used to indicate the need for further assessment in order to rule out an eating-disorder diagnosis. A psychologist working with an eating-disorders population may find this level helpful. However, a psychologist in private practice would not find these levels helpful since they identify a fairly significant proportion of individuals in the general psychiatric population in addition to eating-disorders individuals.

From these findings, it appears that Levels 3 and 4 would accurately screen out individuals who warranted further assessment of eating disorders in a general population. The criterion for these levels minimizes the possibility of screening out individuals in the general population who have a V-shaped configuration and do not have an eating disorder. However, since this risk is decreased the possibility of missing individuals who have an eating disorder is increased. Thus, this criterion used in conjunction with other assessments may help to correctly

identify eating-disorder victims.

Recommendations for Future Research

The present research identified a V-shaped pattern; future research needs to investigate if this pattern is able to screen out eating-disordered patients. The four levels of the V-shaped profile attempted to limit the number of eating-disordered subjects who did not exhibit the V-shaped profile (false negatives). However, this research cannot address the potential number of individuals incorrectly classified as suffering from an eating disorder (false positive) since this research was done on an eating-disorder population.

Future research needs to apply these four levels of the V-shaped profile to a general psychiatric population to gain additional knowledge about the frequency of false positives. Until further research is done on false positives, the clinical utility of the MMPI as a screening device for eating disorders remains uncertain.

Despite the fact that most eating-disorders victims are female, a weakness in this research includes using a female population. It is not known from this research if male eating-disorder victims would endorse the MMPI in a similar fashion as their female counterparts. These results, therefore, are not generalizable to the male population. Including males in the sample, it is hoped, would improve generalizability as well as identify the

impact, if any, of gender on the existence of a 4-5-6 V-shaped pattern.

Future research also needs to address the impact of ethnicity on the existence of the V-shaped pattern as well as scale elevations. This research did not take into account the impact of ethnic differences on the results.

Research on the MMPI-2 has shown that the research pool developed on the original MMPI is appropriate to use with the MMPI-2 (Weed & Butcher, 1992). It would be interesting to perform a similar study on a MMPI-2 eating-disorders sample to see if this is the case. This may become a more relevant issue as the MMPI-2 increases in popularity, and the MMPI is used less frequently.

The impact of comorbidity on the existence of the V-shaped profile also needs to be further studied. Future research needs to address whether major depressive disorder influenced the existence of a V-shaped profile in the bulimic subsample. It is hoped this type of research would clarify whether these significant findings were the result of shared characteristics between the scales and identified diagnosis or a type I error.

APPENDIX A

DSM-III-R EATING DISORDER DIAGNOSIS

DSM-III-R criterion for Anorexia Nervosa are (p.63,1987):

- A. Refusal to maintain body weight over a minimal normal weight for age and height, e.g., weight loss leading to maintenance of body weight 15% below that expected; or failure to make expected weight gain during period of growth, leading to body weight 15% below that expected.
- B. Intense fear of gaining weight or becoming fat, even though underweight.
- C. Disturbance in the way in which one's body weight, size, or shape is experienced, e.g., the person claims to "feel fat" even when emaciated, believes that one area of the body is "too fat" even when obviously underweight.
- D. In females, absence of at least three consecutive menstrual cycles when otherwise expected to occur (primary and secondary amenorrhea). (A woman is considered to have amenorrhea if her periods occur only following hormone, e.g., estrogen, administration).

DSM-III-R criterion for bulimia nervosa are (p. 64, 1987):

- A. Recurrent episodes of binge eating (rapid consumption of a large amount of food in a discrete period of time).
- B. A feeling of lack of control over eating behavior during the eating binges.
- C. The person regularly engages in either self-induced vomiting, use of laxatives or diuretics, strict dieting or fasting, or vigorous exercise in order to prevent weight gain.
- D. A minimum average of two binge eating episodes a week for at least three months.

- E. Persistent overconcern with body shape and weight.

DSM-IV criterion for anorexia nervosa are:

- A. Refusal to maintain body weight at or above a minimally normal weight for age and height (e.g., weight loss leading to maintenance of body weight less than 85% of that expected; or failure to make expected weight gain during period of growth, leading to body weight less than 85% of that expected)
- B. Intense fear of gaining weight or becoming fat, even though underweight.
- C. Disturbance in the way in which one's body weight or shape is experienced, undue influence of body weight or shape on self-evaluation, or denial of the seriousness of the current low body weight.
- D. In postmenarcheal females, amenorrhea, i.e., the absence of at least three consecutive menstrual cycles. (A woman is considered to have amenorrhea if her periods occur only following hormone, e.g., estrogen, administration).

Specify type:

Restricting Type: during the current episode of Anorexia Nervosa, the person has not regularly engaged in binge-eating or purging behavior (i.e., self-induced vomiting or the misuse of laxatives, diuretics, or enemas)

Binge-Eating/Purging Type: during the current episode of Anorexia Nervosa, the person has regularly engaged in binge-eating or purging behavior (i.e., self-induced vomiting or the misuse of laxatives, diuretics, or enemas)

APPENDIX B

DSM-IV EATING DISORDER DIAGNOSIS

The DSM-IV diagnostic criteria for bulimia nervosa involves:

- A. Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following:
 - (1) eating, in a discrete period of time (e.g., within any 2-hour period), an amount of food that is definitely larger than most people would eat during a similar period of time and under similar circumstance
 - (2) a sense of lack of control over eating during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating)
- B. Recurrent inappropriate compensatory behavior in order to prevent weight gain, such as self-induced vomiting; misuse of laxatives, diuretics, enemas, or other medications; fasting; or excessive exercise.
- C. The binge eating and inappropriate compensatory behaviors both occur, on average, at least twice a week for 3 months.
- D. Self-evaluation is unduly influenced by body shape and weight.
- E. The disturbance does not occur exclusively during episodes of Anorexia Nervosa.

Specify type:

Purging type: during the current episode of Bulimia Nervosa, the person has regularly engaged in self-induced vomiting or the misuse of laxatives, diuretics, or enemas.

Nonpurging type: during the current episode of Bulimia Nervosa, the person has used other inappropriate compensatory behaviors, such as fasting or excessive exercise, but has not regularly engaged in self-induced vomiting or the misuse of laxatives, diuretics, or enemas.

APPENDIX C

PERMISSION FOR RESEARCH

Memorial
Hospital of South Bend

March 27, 1996

Karen Baer-Barkley, M.S.
50967 Ridgeview Lane
Granger, IN 46530

Dear Ms. Baer-Barkley:

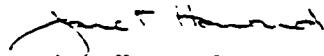
This letter serves to acknowledge the receipt of the protocol, "MMPI-2 Eating Disorders Pattern: The 4-5-6 V-Shaped Configuration". I have determined that the protocol qualifies for expedited review and therefore will not require review by the full IRB. I have, however, asked Deanna Kvietkis, Director of the Records Management Department to also review the protocol.

As Chair of the IRB, it is my pleasure to inform you that the protocol has been approved for a one year period, commencing March 27, 1996 and expiring March 26, 1997. Please be advised that a progress report will be required at the end of the period or at the conclusion of the study.

I understand that you will contact Val Staples to arrange a convenient time to review the client records. Please complete the enclosed Confidentiality Statement and mail it back to me or bring it when you first come to review the records.

Again, thank you for your interest in conducting research at Memorial Hospital of South Bend. If you are in need of further assistance, please feel free to contact me at 284-3221.

Sincerely,



Janet Howard, R.N., M.S.N.
Chair, Institutional Review Board

JH/rbs

cc: Valerie Staples, Program Coordinator, HOPE
IRB Files

615 North Michigan Street
South Bend, Indiana 46601-0086 • 219/231-9211



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Education

ANDREWS UNIVERSITY

Doctoral Candidate, Counseling Psychology

INDIANA UNIVERSITY SOUTH BEND, MAY 1990

Masters of Science, Counseling & Guidance

UNIVERSITY OF NOTRE DAME, MAY 1985

Bachelor of Arts, Psychology

Experience

WESTERN MICHIGAN UNIVERSITY

Pre-Doctoral Internship, August 1997-August 1998

Provide personal and individual counseling to University Students

Co-facilitated sexual assault survivors group

Taught a seminar on career exploration

Provided individual counseling to eating disorders population

ST. MARY'S COLLEGE

Personal Counselor, August 1996 - Present

Provide individual and group counseling to student population

PSYCHOLOGICAL AND FAMILY CONSULTANTS

Counselor, August 1993-Present

Provide individual counseling to children, adolescence, and adults

ANDREWS UNIVERSITY PRACTICUM

Counselor, Andrews University Counseling Center, June 1992-December 1993

Provided individual counseling to children, adolescence, and adults

Provided group counseling to graduate students

INDIANA UNIVERSITY OF SOUTH BEND PRACTICUM

Counselor, Indiana University of South Bend Counseling Center, September 1988-April 1989.

September 1989-November 1989

Provided individual and career counseling to college age population

Facilitated Reinstatement Workshop for college students

H.O.P.E. PROGRAM, MEMORIAL HOSPITAL

Counselor, Masters Internship, September 1989-November 1989

Provided individual and group counseling to eating disorders population

HOSPICE PROGRAM

Group Counselor, Masters Internship, September 1989-November 1989

Co-Facilitated the Hospice Grief Group

AREA AGENCY ON AGING, REGION IV

Case Management Team Social Worker, January 1987-June 1988

Performed assessments of clients' social and emotional needs

Provided short term counseling

Worked with social service delivery system

ST. JOSEPH RESIDENTIAL SERVICES, INC.

Social Service & Activity Director, July 1985-December 1986

Coordinated admission/discharge services, care planning, volunteers, resident activities

Provided support and assistance to residents' families

Professional Affiliations

American Psychological Association, Graduate Student Affiliate

Academy of Eating Disorders

International Association of Eating Disorder Professionals

Gamma Omega Honors Society

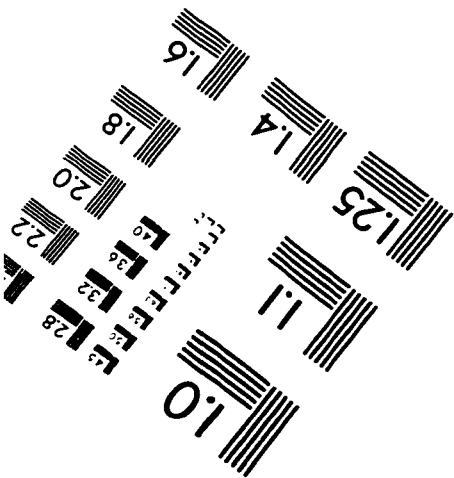
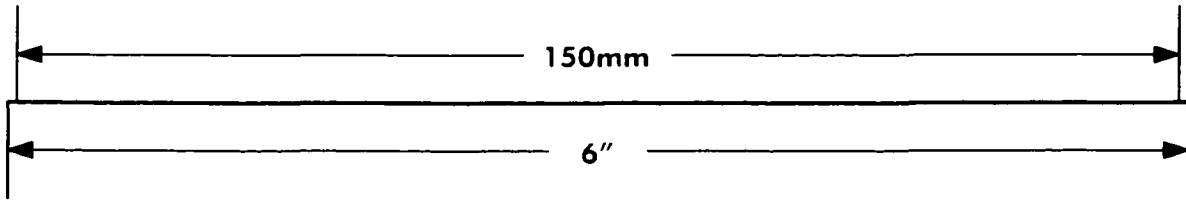
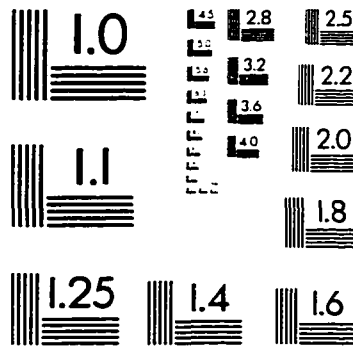
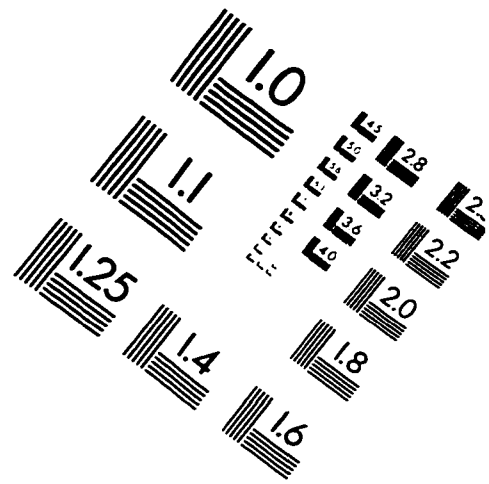
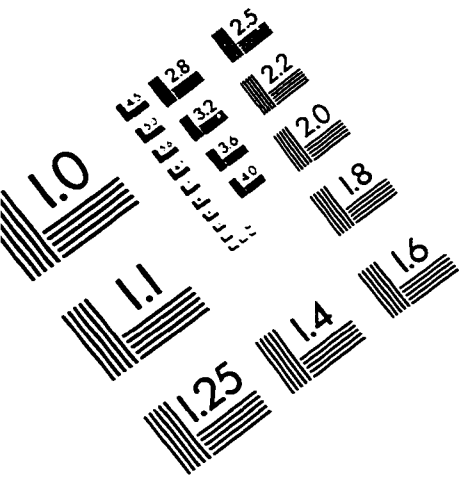
Publications

Brantley, P.S., Brantley, L.S., & Baer-Barkley, K. (1996)

"Transforming Acting-out Behaviors: A Group Counseling Program for Inner-city Elementary School Pupils"

Elementary School Guidance and Counseling, 31;2,96-105.

IMAGE EVALUATION TEST TARGET (QA-3)



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